The Dissertation Committee for Barbara Ann Boutwell Jansen certifies that this is the approved version of the following dissertation:

New Media's Support of Knowledge Building and 21st Century Skills Development in High School Curricula

Committee:

Barbara F. Immroth, Supervisor

W. Bernard Lukenbill

Loriene Roy

S. Craig Watkins

Yan Zhang

New Media's Support of Knowledge Building and 21st Century Skills Development in High School Curricula

by

Barbara Ann Boutwell Jansen, B.S.Ed.; M.Ed.; M.L.I.S

Dissertation

Presented to the Faculty of the Graduate School of

The University of Texas at Austin

in Partial Fulfillment

of the Requirements

for the Degree of

Doctor of Philosophy

The University of Texas at Austin

May 2014

Dedication

This work is dedicated with love to my mother Marilyn Pinson

and to my husband Larry Baird.

And to Frankie.

Acknowledgements

How do I measure success? Not by the degrees that hang on my wall or by the number of articles and books I have had published over the years, but by people who have loved, encouraged, and supported me throughout my growth as a human and as an educator.

My committee is the best I could imagine. Each member steered me through the doctoral program with kind words and sound advice every step of the way. I owe a huge debt of gratitude to Dr. Barbara Immroth, my committee chair, longtime colleague, and friend who stoked my passion for school libraries and helped me understand the important role of the librarian as an instructional leader in her school. Dr. Immroth's commitment and life of service to libraries and librarians in Texas and beyond continues to serve as an inspiration to all librarians. Dr. Bill Lukenbill, Emeritus, offered excellent advice on content and writing and always had a kind and supportive word. I am so appreciative that he agreed to continue serving on my committee even after his retirement. Dr. S. Craig Watkins's long time involvement in examining the opportunities and challenges of young people's participation in the new media ecology spurred me to study this topic before I joined the program. His passion extends beyond academia, and his results continue to serve educators as we work to close the gap between informal and formal learning opportunities. Dr. Yan Zhang was the perfect addition to my dissertation committee with her knowledge of information needs, information seeking, and the

research process. Her questions made me think more deeply about my methods and research design. Dr. Loriene Roy, who kindly and ably stepped in to fill some very large shoes, gave practical and theoretical advice and feedback on my writing as if she had been on my doctoral committee from the beginning. Finally, Dr. Glynn Harmon encouraged me through the first years and the qualifying process, always contributing sage advice and wise counsel through his sweet and kind words of encouragement. May he rest in peace.

Family members and close friends supported and influenced me personally and professionally through the years. My sweet momma, Marilyn Pinson, is my biggest cheerleader. She continues to be an inspiration to me in every facet of my life, and remains one of my best friends. She understands the many sacrifices that a good education requires and values the many returns it gives. My husband, Larry Baird, is my rock and the best person I know. He is sweet and kind and kept the home fires burning, taking excellent care of our old schnauzer and my momma during those many days I spent away from home in the Hill Country, reading and writing papers. He cooked wonderful meals for me at home and took care of all things domestic. I am lucky to know his love. George Jansen, my sweet first husband and good friend, supported me in many ways through three degrees from the University of Texas and is still part of my heart and family.

My best friends supported me in so many ways, beginning by the lessons I learned from them along the path of our friendships. Sarah Hilburn has been with me through thick and thin since we started teaching second grade together in 1985. Her

generous spirit and love for all living things inspire me to be a better person. There are no words to fully express what she means to me. Dr. Marla McGhee took a chance on someone with no experience and hired me as her school librarian at Live Oak Elementary School in 1989. It is from her that I learned how to be a good teacher. To this day, I have not worked for a finer instructional leader. I am honored that I served as her two daughters' ninth grade advisor, share authorship of two books with her, and continue to have fun every time we are together. She convinced me that I could complete a doctorate and is the one person in my personal life that truly understands what the process entails. She offered sound technical advice and needed emotional support throughout the five years I spent in the program. Beginning in the Longhorn Band many years ago, Jeni Johnson helped me understand what it is to be a friend and inspired me with her work ethic. Jeni and Faith Edwards-Allen, another friend from LHB, gave me moral support and inspired me to finish the program hoping that we could have some fun again.

My success as a school librarian is due much in part to teaching colleagues who have recognized the value of collaboration. I have collaborated with them to develop authentic learning experiences that integrate print and digital resources, useful technology, and information literacy skills. They are smart and dedicated, and bring good humor and expertise to their classrooms each day. My gratitude goes to Dina Tucker, Jeff Osborne, Laura Cox, Richard Kriese, John Pomeroy, Darryl Borges, Jim Currin, Veronica Putney, Hope Ruiz, Jennie Luongo, Nathan Michaud, Jenny Kronke, Kimberly Horne, Matt Kelly, Brady Nash, Caroline Pinkston, John Fitzsimons, Gustavo Garza, Courtney Itson, Marsha Russell, Todd Stephenson, and Linh Tran. Other colleagues, who

I am also proud to call friends, support my efforts at school and make every work day a joy. Thank you to Susan Kemner Reed, Joan Winter, Jim Currin, and Minnie Hollyman. Special thanks to Dr. Mike Eisenberg and Bob Berkowitz. Learning the Big6 process of information problem solving from and collaborating with them over the last 20 years has made me and countless others better school librarians.

New Media's Support of Knowledge Building and 21st Century Skills Development in High School Curricula

Barbara Ann Boutwell Jansen, Ph. D.

The University of Texas at Austin, 2014

Supervisor: Barbara F. Immroth

There is a growing consensus that the character of pedagogy must shift from one of teacher- and textbook-directed instruction to one of student-centered learning. This transition stems from the need to maintain the United States' competitive edge in the world market and prepare young people for a society that is more socially, economically, and politically complex. Progressive educators advocate for a "learning reform" facilitated by digital media, and the skills and competencies that young people develop through using participatory media in an informal setting. This study examined how the use of new media can support subject-area knowledge building and 21st century skills development in nine classrooms in an independent high school.

A constructivist grounded theory approach guided the collection and analysis of empirical data. This process took the form of semi-structured interviews with students and teachers, classroom observations, and an examination of course-related documents. A symbolic interactionist perspective framed the data analysis. The study examined wiki use, blogging, microblogging, and document sharing in six high school subject areas: ninth grade History, Latin II, Advanced Placement Art History, twelfth grade English,

Anatomy and Physiology, and Environmental Science. Conceptual categories derived from the findings suggest that the use of specific new media tools support subject-area knowledge building, both explicit and tacit. This occurs by promoting participation among all students, which helps students broaden their perspectives through universal access to their peers' thinking. Findings also suggest that the integration and use of these specific new media tools support the development of certain 21st century cognitive and interpersonal skills. The findings from this study support two substantive theories: 1) The use of new media support knowledge building and skills development through increased participation, leading to broadening students' perspectives about subject-area content, and 2) as students engage in knowledge building activities, specific features of new media support the development of specific 21st century skills within the cognitive and interpersonal domains. The results of this study provide educators with a set of guidelines to consider as they integrate new media into subject-area curricula, and offer an agenda for further research on a local and national level.

Table of Contents

List of Tables

List of Figures

List of Illustrations

Chapter One: Introducing a Study of New Media Support in Formal Learning

> A child who has grown up with the freedom to explore provided by such machines will not sit quietly through the standard curriculum dished out in most schools today. Already, children are made increasingly restive by the contrast between the slowness of school and the more exciting pace they experience in videogames and television. (Papert, 1993)

INTRODUCTION

There is a growing consensus that the character of pedagogy must shift from one of teacher- and textbook-directed instruction to one of student-centered learning. This transition stems from the need to maintain the United States' competitive edge in the world market and prepare young people for a society that is more socially, economically, and politically complex. To achieve their full potential as adults, young people need to not only master domain knowledge and skills in school subjects, but also demonstrate the ability to use a wide range of resources in collaborating with others to solve authentic problems, create new content and innovative products, and communicate information and ideas to a range of audiences. The call for education reform comes from the business sector (Jennings, 2012; Partnership for 21st Century Skills, 2008; National Research Council, 2012, p. 1; Department of Labor, 1991), progressive educators and related education organizations and associations (Brown & Thomas, 2010; Commission on

Accreditation, 2010; Gee & Hayes, 2011; Ito et al., 2010; Ito et al., 2013; Jenkins, Clinton, Purushotma, Robison, & Weigel, 2006; MacArthur Foundation, 2009; Partnership for 21st Century Skills, 2008; Rheingold, 2008; Robinson, 2006; Tapscott, 2009), and policy makers through the federal and state "Race to the Top" grants (U.S. Department of Education, 2009), the National Education Technology Plan (Transforming American Education, 2010), and the Common Core State Standards (National Governors Association Center for Best Practices & Council of Chief State School Officers, 2012).

The business sector calls for a different set of skills than those that are currently privileged in traditional curricula. In 1991, the Department of Labor released a groundbreaking report on the state of changes in the workplace and how schools prepare young people for work (p. 1). In the introductory letter, the Secretary's Commission on Achieving Necessary Skills (SCANS), comprised of representatives from schools, businesses, unions, and government, called for high school students to learn a "new set of competencies and foundation skills" (p. i). To educators, it commanded that they "instill in students the perspective on results that the SCANS skills demand." The letter also warned that by neglecting the command, educators would "be failing . . . [their] students and . . . [their] community" (p. iv).

A Price Waterhouse Coopers 2011 survey of CEOs found that "66 percent say that lack of the right skills is their biggest talent challenge" (Jennings, 2012. p. 2). Some of Canada's most senior high-tech CEOs said that their companies did not need people with technical skills, but "needed people who could think, synthesize ideas,

communicate, place things in context, and understand the relationships among ideas" (Tapscott, 2009, p. 142). The Partnership for 21st Century Skills (2008) cites a study from M.I.T. which finds that computerization of the workplace has increased the need for "problem solving and communications tasks" (p. 6). The report also cites a study from the Ewing Marion Kauffman Foundation offering strong evidence that "fueling creativity, innovation and adaptability that are the hallmarks of competitive, high-growth and emerging industries requires a highly skilled, creative, and nimble workforce" (p. 7).

Progressive educators advocate for a "learning reform" strongly facilitated by digital media and the skills and competencies young people acquire through their affiliations using online social networks and other participatory media in an informal setting (Gee & Hayes, 2011, p. 69; Ito et al., 2010; Jenkins, Purushotma, Weigel, Clinton, & Robison, 2006; Livingstone, 2009; Tapscott, 2009; Watkins, 2009). Many educators and education organizations are borrowing ideas for school reform from this new out-of-school system (Gee & Hayes, 2011, p. 69), and integrating new media tools and resources into the curriculum in innovative methods. The MacArthur Foundation awards grants to explore the influence of digital media on formal and informal learning (MacArthur Foundation, 2009, p.1). The Partnership for 21st Century Skills (The Partnership for 21st Century Skills, 2007), the National Association for Independent Schools (Commission on Accreditation, 2010, pp. 13-35), and the Committee on Defining Deeper Learning and 21st Century Skills (National Research Council, 2012) offer ideas for schools to reform pedagogy by providing specific examples of new media use that they consider effective

practices. In my own experience collaborating with teachers in elementary, middle, and high school, many teachers embrace the affordances of new media, using these tools to motivate and engage their students.

NEW MEDIA

While many educators may want to frame the discussion around the effective and innovative use of specific technologies in the classroom, the discussion needs to focus on how technology may contribute to learning, literacy, and knowledge (Parker, 2010), and the effect that those practices can have in education reform.

Definition

Used interchangeably in the professional and scholarly discourse, social media, new media, read/write web, Web 2.0, interactive media, and participatory media all refer to the same category of technologies. Bryer and Zavatarro (2011) define social media as those "technologies that facilitate social interaction, make possible collaboration, and enable deliberation across stakeholders. These technologies include, but are not limited to, blogs, wikis, media (audio, photo, video, text) editing and sharing tools, networking platforms (including *Facebook*), and virtual worlds" (p. 327). Pavlik and Powell (2003) suggest that new media include a "variety of technologies that perform the following five functions: (1) information gathering, searching, sorting, and communicating; (2) production, editing, and design; (3) storage, representation, and retrieval; (4) distribution; and (5) access, design, and display" and that the functions are often "intertwined and integrated into single technical devices" (pp. 225-226). Boyd & Ellison (2008) define the

term “social network sites,” as “web-based services that allow individuals to (1) construct a public or semi-public profile within a bounded system, (2) articulate a list of other users with whom they share a connection, and (3) view and traverse their list of connections and those made by others within the system” (p. 211). Ito et al. (2010) “use[s] the term ‘new media’ to describe a media ecology where more traditional media, such as books, television, and radio, are ‘converging’ with digital media, specifically interactive media and media for social communication” (p. 10).

This study will use “new media” when referring to the technologies that collectively include blogs (*Tumblr*), wikis (*PBWorks*), microblogging (*Twitter*), and document sharing (*Google Docs*) that emerged from the evidence. *Tumblr* is a blogging platform (creating a post with space for individual comments), *Twitter* is a microblogging platform (each post no more than 140 characters including spaces), *PBWorks* allows users to co-create a website with spaces for comments, and *Google Docs* permits users to edit shared documents either in real time or asynchronously. Individual tools will be referred to by their appropriate terms. While there are many reasons for using these tools, the main reason may be “the belief that students have the motivation and technical expertise needed to use them effectively[,] and because Web 2.0 technologies ‘comprise participatory technologies aimed at knowledge sharing and knowledge construction, [therefore] they are viewed as having tremendous potential for learning’” (quoted in Ertmer et al., 2011, p. 213).

Affordances

It is no surprise that young people are drawn to new media. Livingstone, Couldry, & Markham (2007) assert that the "architecture of the Internet—its flexible, hypertextual, networked structure, its dialogic, interactive mode of address, its alternative, even anarchic feel—particularly appeals to young people, fitting their informal, peer-oriented, anti-authority approach, making this an environment in which they feel expert and empowered" (p. 3). Young people may feel more expert and empowered in the online environment, especially by contrast with the traditional, linear, hierarchical, logical rule-governed conventions often used in conventional communications with youth (Livingstone, 2009, p. 121). It is a venue in which youth are not "stigmatized by their age or specifically blocked from participation because of status" (Youniss et al., 2002, p. 138). The new media ecology

> (a) increases the speed with which information can be gathered and transmitted, (b) increases the volume of information that is easily accessible, (c) creates greater flexibility in terms of when information is accessed, (d) provides greater opportunity and mixes of interactivity (one to one, one to many, many to one, and many to many), (e) shifts the nature of community from geographic to interest based, (f) blurs distinctions between types of media (print, visual, and audio), (g) challenges traditional definitions of information gatekeepers and authoritative voices, and (h) challenges traditional definitions of producers and consumers of information. All of these characteristics have potential implications for the

> motivation, ability, and opportunity to become engaged in public life. (Delli Carpini, 2010, pp. 346-347)

Along with youths' affinity for new media, affordances extend to the classroom. Professional educational journals, conferences, webinars, web logs (blogs), and social networks call for and provide strategies for educators to use new media in their classroom and school library settings. Accessing and using new media sites and tools such as blogs, social bookmarks, social networks, shared documents (i.e., *Google Docs*), video and photo sharing, and wikis has the potential to provide opportunities for critical thinking and developing creative ideas and products, while providing unique occasions for students to collaborate and share—which are all valuable 21st century skills. Harel Caperton, Oliver, & Sullivan (2008) assert that these tools used in a "new educational paradigm, encourage young people to imagine, create, process, and share ideas and expertise as they create artifacts and tell stories" (p. 12).

Many social media sites also allow access to information not contained in traditional sources (subscription databases, library shelves, and read-only websites—some of these containing little more than a compilation of facts), and

> using only traditional sources, students may produce nothing more than a bland summary of information distilled in secondary and tertiary sources. Consider the proprietary historical videos available on *YouTube*, podcasts of radio transcripts on iTunes, *Wikipedia*'s current or lesser-known topics not found in *Britannica* or *WorldBook*, and the numerous blogs such as those maintained by authors,

> journalists and political pundits, subject-area experts, as well as those by media agencies, political, governmental, scientific, technical, nonprofit, and educational organizations. By using both traditional and new media sources, students can add value to their academic experience by critically analyzing events and first person viewpoints in order to draw their own conclusions, adding to the body of knowledge instead of always borrowing from it. (Jansen, 2011 p. 48)

School librarians and teachers are finding critical and creative uses for social media in subject-area content and across the curriculum. Recognizing the importance of resources and tools in the new media ecology, school librarians and teachers continue to explore the effectiveness of content contained within new media, as well as ways that students and educators can use features that allow for collaboration, creation, and communication of ideas.

Challenges of Using New Media in Formal Education

Incorporating new technologies in the curriculum has challenged educators since before the introduction of television in the classroom. With the ubiquity of new media comes a host of new obstacles to overcome.

Ethics, safety, privacy, and moral panic

In order to ensure the safety of students and educators, guidelines concerning the appropriate use of participatory media have expanded in tandem with access to the new media ecology. Though the media is replete with stories of unethical political and business leaders, educators have the added challenge of modeling and instructing young

people in the appropriate online behavior and the use of others' ideas and information. Popular social networks present major confidentiality, privacy, and professionalism concerns to school principals. There is a high risk of sharing inappropriate social content or 'friending' of students (School Principals and Social, 2010, p. 8) and they are concerned about legal issues such as lawsuits (p. 19). Livingstone (2009) and Watkins (2009) both discuss the media bias towards covering sensational topics like online pedophiles and cyberbullying over the positive uses of the new media ecology by young people. Indeed, the risks children face online by strangers is rare, but the online bully is quite real and represents a threat that has scaled in occurrence enough to be elevated on the public policy agenda (Livingstone, 2009, p. 157). While online bullying may occur outside school hours, it can affect the academic performance of the victim, demanding the attention of school administrators and counselors. "Anxieties over new media's threat to established ways of life have emerged in almost lockstep with the introduction of each new medium since the printing press" (as quoted in Ito et al., 2013, p. 30) and "moral panics over the supposed loss of tradition, parental authority, and shared values accompanied the introduction of children's comics in the eighteenth century, cinema at the end of the nineteenth, television in the twentieth, and the [i]nternet in the twenty-first century" (Ito et al., 2013, p.30).

Digital participation divide

While new technologies provide ways to attend to and participate in the public sphere, they require access and skills to use them effectively. Harel Caperton, Oliver, &

Sullivan (2008) contend that “poor and underserved communities encounter two digital divides”: the first by the lack of access to high-speed internet, and the second by “digital literacy . . . the ability to create, not just consume, digital media” enabling “true participation in the power and potential of the new internet” (p. 8). Tripp & Herr-Stephenson (2009) affirm that assertion suggesting that while “digital inequality is partly about unequal access to particular technologies,” it is also “about a gap in the ways those technologies are framed, understood, and used in different contexts” (p. 14). Milner (2009) agrees, commenting that while “digital technologies can boost civic literacy and the proportion of citizens with the knowledge and skills to be effective citizens, . . . they can also exacerbate class-based gaps in such knowledge and skills” (p. 17). Almost all youth have access to the internet somewhere (Lenhart, Purcell, Smith, & Zickuhr, 2010, p. 9; Livingstone, Couldry, and Markham, 2007, p. 21), but low-income youth often lack broadband access at home and depend on using the internet at a friend’s house, or their school or public library, which often filters access and frequently blocks participatory media. This limits access to “networks of informal education and support that make navigating the challenges of digital citizenship more manageable” (Watkins, 2009, p. 33) and transforms the digital divide, or gap, into one of participation. “As digital media technology evolves into a dynamic form of literacy, personal expression, and involvement in civic life, the participation gap between poor and affluent kids grows more urgent” (Watkins, 2009, p. 32). Jenkins (2006) argues that we need to confront the

cultural factors of race, class, and language differences that "amplify these inequalities in opportunities for participation" (p. 269).

While technological access in schools could potentially even the playing field, inequality still exists. Teachers who are employing effective strategies in civics classrooms and transforming the learning experiences for their students tend to be in more affluent schools (Haste, 2010, p. 183; McLeod, Shah, Hess, & Lee, 2010, p. 383). An analysis of the 1999 International Association for Educational Achievement indicates that favorable attitudes toward a range of political activities were associated with the degree to which "classrooms were more open, interactive, and focused on participation," but that these characteristics were less likely to occur in mixed-race classrooms (cited in Bennett, 2007, p. 72).

To close this skill-based digital divide, young people need to develop "an ICT [information and communications technology] form of literacy akin to, and comprising, print literacy" (Milner, 2009, p. 12), what media scholars and educators refer to as media and information literacy. Schools need to "make concerted efforts toward developing . . . communications competencies" (McLeod, Shah, Hess, & Lee, 2010, p. 368).

Maintaining academic rigor

The final challenge to bringing skills, competencies, and behaviors learned in informal spaces into the formal educational setting is to maintain a rigorous academic focus. The tendency may be to use the tools superficially in order to meet youth where they are socially. For example, a teacher may wish to have students create a *Facebook*

page for a notable person including friends and interests. Instead the student should be examining factors that lead a notable person to important life decisions and how he or she contributed to society as we experience it. Higher level thinking and relevant context will motivate the student while engaging his or her mind and developing essential skills. A meaningful approach to learning also lends itself to student collaboration and sharing results with a broader audience using available new media.

Educators may be wise to concentrate on how youth engage in the participatory culture and new media ecology and consider the possibilities those practices can have in formal education to support knowledge building and skills development.

STATEMENT OF THE PROBLEM

Nationally, there is a call to action for smart, innovative, and informed leadership in 21st century learning in preK–12 education (Lemke, 2010, p. 245). Educational organizations heeded the call by implementing new standards (American Association of School Librarians, 2007; International Society for Technology in Education, 2007; Partnership for 21st Century Skills, 2009). The public calls for reform are illustrated by the mainstream documentary "Waiting for Superman," the sections on "Education Reform" in *Huffington Post* and *Wikipedia*, the alternative for states to opt out of the "No Child Left Behind" legislative mandate through the controversial "Race to the Top" initiative and grants, and 44 states adopting the Common Core State Standards, and numerous reports in the popular press. However, the state of education seems to remain firmly locked in the traditional practices of teacher- and textbook-transferred content

assessed through standardized measurement. This often results in bored and disconnected students who passively consume discrete, static domain knowledge.

Impediments to Education Reform

A number of factors are stalling reform. Due to the rigid requirements of "No Child Left Behind" and "Race to the Top" legislation, many schools require teachers to spend inordinate amounts of time "teaching to the test," to the detriment of inquiry and non-tested subjects. For example, citizenship knowledge and skills lag far behind math and reading, and many school systems have abandoned civic education altogether (Bennett, 2008, p. 16). A 2007 survey showed that "nearly half of the [school] districts surveyed cut instruction time in social studies . . . in favor of those subjects that are tested like reading and math" (cited in Tapscott, 2009, p, 129; McLeod, Shah, Hess, & Lee, 2010, p. 383).

> Current educational policies and associated accountability systems rely on assessments that focus primarily on recall of facts and procedures, posing a challenge to wider teaching and learning of transferable 21st century competencies. . . . In the face of current fiscal constraints at the federal and state levels, assessment systems may seek to minimize costs by using these types of tests, rather than incorporating the richer, performance- and curriculum-based assessments that can better support the development and assessment of 21st century competencies. (National Research Council, 2012, p. 11).

In my consulting work with school districts, school librarians complain that teachers do not have time to collaborate with them to design and teach meaningful project-based inquiry to their students. Standardized testing—both federally mandated assessment and accountability—pressures teachers to rely on textbooks and lecture to teach factual knowledge that is more easily assessed. This is also true of the College Board's Advanced Placement textbook-driven and lecture-heavy course requirements and standardized assessments for advanced college credit. The Advanced Placement curriculum assesses individual writing and critical thinking skills in addition to factual knowledge, but the content-heavy courses leave little room in the curriculum for developing collaboration, creativity, and communication skills, which take longer to implement into a lesson and are more difficult to assess (National Research Council, 2012, pp. 189-190). While independent schools are not bound to the federal accountability system, AP course restrictions perpetuate traditional pedagogy, as many schools bolster their rigorous course offerings with AP courses.

Another impediment to education reform is the lack of a widespread integration of new media tools in curriculum and pedagogy. This is true despite the fact that studies show strong evidence that in informal settings, young people learn valuable skills through their interactions in the new media ecology. Ito et al. (2010) finds that

> contrary to adult perceptions, while hanging out online, youth are picking up basic social and technological skills they need to fully participate in contemporary society. Erecting barriers to participation deprives teens of access to these forms

> of learning. Participation in the digital age means more than being able to access "serious" online information and culture. Youth could benefit from educators being more open to forms of experimentation and social exploration that are generally not characteristic of educational institutions. (p. 39)

According to administrators who responded to a 2009 survey, the top three reasons for using new media in schools are "to (1) keep students interested and engaged in school, (2) meet the needs of different kinds of learners, and (3) develop the critical-thinking skills of students (Lemke, 2010, p. 245). To date, that potential remains untapped with many school districts requiring students to leave their digital devices, such as smartphones, cell phones, tablet computers, and personal music players at home, in their cars, or turned off in their lockers (Lemke, 2010, p. 245). Teachers' own skepticism, lack of skills, lack of training, or negative results from initial experiences with new media may prevent many from integrating new media in their instruction. Many teachers "tend to teach the way they were taught with an emphasis on instructor-based strategies that value content acquisition over the learning process" (Mandernach, 2006, p. 42). A lack of empirical evidence suggesting that the use of new media helps build content and develop research and writing skills may inhibit integration since teachers are under pressure to teach assessable knowledge and skills and thus rely on traditional methods. Progressive educators who wish to integrate new media often find that their school and district administrators have blocked access to these tools. This can stem either from a fear and concern for protecting student privacy, or a misunderstanding or deliberately restrictive

interpretation of the requirements of the federal Children's Internet Protection Act (CIPA) (Lemke & Coughlin, 2009, p. 25, 27), that requires technological filtering of computers for most of America's public schools (Consolidated Appropriations Act, 2001). Recent mainstream publications showcasing the negative effects that the internet and digital media can have on young people (Bauerlein, 2009; Carr, 2011) have contributed to the public's skepticism and fear of new media use among teens.

For educators who have both willingness and unfiltered access (most independent schools are not bound by CIPA requirements), new media tools can be difficult to set up and monitor. They present obstacles to teaching and challenges to learning, as teachers must go to great lengths to adjust settings and provide monitoring safeguards to protect student privacy (McNaught, Lam, Kwok, and Ho, 2011, p. 147). Some students may demonstrate inappropriate or inattentive behavior while using the internet. And, students who perform well in traditional classroom settings will occasionally resist efforts by teachers to introduce new teaching methodologies and collaborative learning experiences. McNaught, Lam, Kwok, and Ho (2011) found that the even though students "may be using the new technologies in their everyday lives, they may still need to be persuaded of the benefits for educational purposes" and that if they did not perceive an authentic need and real benefits, the "strategies will fail" (p. 147).

The burgeoning number of school administrators, school librarians, and teachers making the shift to authentic learning pedagogy provide mostly glowing anecdotal accounts of the benefits of new media in the classroom. But the reports focus mainly on

the technological tools that students use to practice 21st century skills and not on the specific learning that is occurring. Few empirical studies exist that provide evidence suggesting that informal participation in the new media landscape as practiced by youths can support or bolster their learning behaviors in school-related tasks, while simultaneously retaining the rigor of the academic subject expectations. But educators and researchers would nonetheless be wise to begin leveraging those skills, competencies, and behaviors. Rheingold (2008) cautions that "media technologies and practices are moving too quickly for us to wait for empirical understanding of changed learning and teaching styles before engaging young people with the civic potential of participatory media," as it is vital to the "future of the public sphere . . . that young people should be included . . . in the discussion of how they are to be educated as citizens" (p. 114). One can substitute "educational" for "civic" in Rheingold's assertion and begin exploring the opportunities for young people and educators.

The problem this study addressed was the lack of empirical evidence that may support the influences of new media use in subject-area knowledge building and skills development.

SIGNIFICANCE OF THE STUDY

New media use in the classroom is an emerging area of study. Watkins (2009) interviewed and observed teachers using social media in the classroom and found that students' interest level rose, evidenced by students asking if they could view the same media at home. In her dissertation study, Forte (2009) noted positive results when

interviewing and observing students in an independent high school using wikis to collaborate on science content in comparison to the obstacles that may be presented in a public high school. Tripp and Herr-Stephenson (2009) concluded that "the [school] assignments offered limited opportunities to connect in-school learning to students' out-of-school literacies and interests" and though students enjoyed the multimedia production, they remained uninterested in the curricular content. Dredger, Woods, Beach, & Sagstetter (2010) found that teens were motivated to write for their own authentic purposes and suggested "that English teachers can forge a 'third space' in which out-of-school literacy practices are integrated into the curriculum" (p. 101). The study stopped short of gathering empirical evidence in the classroom. Rheingold (2010) suggests that

> the introduction of social media into education as both an issue to be studied and a set of competencies to be mastered has been delayed by the lack of empirical evidence. Without systematic observation of what tech-savvy kids actually do in and out of school it isn't easy to weigh the claims of enthusiasts against skepticism of those who correctly recall the magical thinking that accompanied the introduction of the personal computer into education.

Empirical evidence will help prove the notion that new media can contribute to learning essential content and skills. The emerging data offer a substantive theory and model, as well as a set of guidelines for educators in the effective and safe use of new media in formal learning settings. Supporting evidence will help counteract the public's

often-negative perception about young people's use of new media and the lack of support by many educators for use of new media in the secondary school curriculum.

RESEARCH QUESTION

In order to determine whether new media use in the classroom will support content knowledge building and development of 21st century skills, it will be necessary to study how it is currently being integrated in high school curricula.

How can the use of new media in high school curricula support subject-area knowledge building and development of 21st century skills?

SENSITIZING CONCEPTS

While some authors of qualitative research literature prefer not to begin research with a theoretical framework or set of sensitizing concepts, there are some instances where it can be useful (Corbin & Strauss, 2008, p. 39). Sensitizing concepts provide a rationale for determining the grounded theory methodology used as well as for developing initial interview questions, concepts, and ideas for theoretical sampling (Charmaz, 2006, pp. 168-169; Corbin & Strauss, 2008, pp. 40, 42).

Participatory Culture and the New Media Ecology

It is no surprise that young people have taken to communicating and sharing through social media and statistics suggest nothing less. Thirty eight percent of teens who use the internet share self-created content online (Lenhart, Purcell, Smith, & Zickuhr, 2010, p. 42), 14 percent write blog posts, and 52 percent comment on friends' blogs (p. 45). The popularity of *YouTube*, *MySpace*, and other new media sites that encourage

user-generated content and communication suggests that the emerging digital media culture is increasing opportunities for young people to connect, engage, and create (Montgomery, 2008, p. 29).

Jenkins, Purushotma, Weigel, Clinton, & Robison (2006) call the activity that youth enjoy online a "participatory culture," which they define as having "low barriers to artistic expression and civic engagement, strong support for creating and sharing one's creations, and some type of information mentorship whereby what is known by the most experienced is passed along to novices, members who believe that their contributions matter, and members who feel some degree of social connection with one another (at the least, they care what other people think about what they have created)" (pp. 5-6).

A growing body of scholarship suggests potential benefits of a participatory culture, including opportunities for peer-to-peer learning, a changed attitude toward intellectual property, the diversification of cultural expression, the development of skills valued in the workplace, and a more empowered concept of citizenship that can be integrated into formal learning (Jenkins, Purushotma, Weigel, Clinton, & Robison, 2006, p. 3). Ito et al. (2010) suggests that the "emergence of networked public culture may shape and transform social interaction, peer-based learning, and new media literacy among young people" (pp. 18-26), and describes the informal practices of learning and media engagement of youth through "friendship-driven and interest-driven genres of participation" (p. 17). Within those genres of participation, youth "hang out" with friends by chatting on a social network or playing online games. Most of these relationships,

while maintained online, are developed and sustained face-to-face. Driven by their own interests and motivations, young people also "mess around" by producing and sharing digital media, searching for needed or interesting information, looking around, experimenting, or simply playing online. An additional genre of participation finds youth "geeking out" by delving deeper into one area of interest and displaying "an intense commitment or engagement with media or technology" (p. 65). These "geeks" learn to navigate "domains of knowledge and practice and [are] able to participate in communities that traffic in these forms of expertise" (p. 67).

A new report by Ito et al. (2013) further builds on the informal learning that youth enjoy through their participation in the new media ecology by suggesting an approach to education they call "connected learning" that "advocates for broadened access to learning that *is socially embedded, interest-driven,* and *oriented toward educational, economic, or political opportunity"* (p. 4). It "addresses the gap between in-school and out-of-school learning, intergenerational disconnects, and new equity gaps arising from the privatization of learning" (p. 4).

> Connected learning is realized when a young person pursues a personal interest or passion with the support of friends and caring adults, and is in turn able to link this learning and interest to academic achievement, career possibilities, or civic engagement. Digital and networked media offer new ways of expanding the reach and accessibility of connected learning so it is not just privileged youth who have these opportunities. Connected learning looks to digital media and

> communications to: 1) offer engaging formats for interactivity and self-expression, 2) lower barriers to access for knowledge and information, 3) provide social supports for learning through social media and online affinity groups, and 4) link a broader and more diverse range of culture, knowledge, and expertise to educational opportunity. (Ito et al., 2013, p. 6)

"Participatory culture shifts the focus of literacy from individual expression to community involvement" (Jenkins, Purushotma, Weigel, Clinton, & Robison, 2006, p. 6), and to this end, national education organizations advocate shifting from teaching discrete and specific technology and research skills toward the acquisition of a broader set of social skills, attitudes, and competencies. In response to the call for reform, the 21st century skills movement, led by the Partnership for 21st Century Skills—consisting of leading educational associations and technology companies—succinctly categorizes these participatory skills into "the four Cs . . . critical thinking and problem solving; communication, collaboration; and creativity and innovation" ("Our Mission," n.d.). National education organizations have heeded the call for reform by updating their standards for student learning to promote skills and attitudes that will engage students in a participative environment while encouraging problem solving and collaboration (American Association of School Librarians, 2007; The International Society for Technology in Education, 2007). The Department of Education encourages public schools to adjust policy and instruction to reflect the teaching and learning of current skills needed in the workforce. The National Educational Technology Plan asserts that

> … 21st century competencies and expertise such as critical thinking, complex problem solving, collaboration, and multimedia communication should be woven into all content areas. These competencies are necessary to become expert learners, which we all must be if we are to adapt to our rapidly changing world over the course of our lives, and that involves developing deep understanding within specific content areas and making the connections between them. (*Transforming American Education*, 2010, p. xvi)

21st Century Skills

Referred to in various literature as "deeper learning, twenty-first century skills, college and career readiness, student-centered learning, next-generation learning, new basic skills, and higher-order thinking," 21st century skills include "both cognitive and non-cognitive skills—such as critical thinking, problem solving, collaboration, effective communication, motivation, persistence and learning to learn—that can be demonstrated within core academic content areas that are important to success in education, work, and other areas of adult responsibility" (National Research Council, 2012, p. 1). The Committee on Defining Deeper Learning and 21st Century Skills

> views the various sets of terms associated with the 21st century skills label as reflecting important dimensions of human competence that have been valuable for many centuries, rather than skills that are suddenly new, unique, and valuable today. The important difference across time may lie in society's desire that all

> students attain levels of mastery—across multiple areas of skill and knowledge—that were previously unnecessary for individual success in education and the workplace. At the same time, the pervasive spread of digital technologies has increased the pace at which individuals communicate and exchange information, requiring competence in processing multiple forms of information to accomplish tasks that may be distributed across contexts that include home, school, the workplace, and social networks. (National Research Council, 2012, p. 3)

The move to reform pedagogy toward authentic student-centered learning focuses on developing 21st century skills that should be mastered by individuals but are more often learned and practiced in a collaborative environment. Learning outcomes are most often "framed in terms of individual knowledge, skills, competencies, and dispositions. . . . we see the collective and individual outcomes of connected learning as integrally related to one another" (Ito et al., 2013, p. 47). "Today's schools are focused on individual acquisition of knowledge, student by student, despite the fact that, increasingly, society, community, and work emphasize teaming, collaboration, and participatory learning" (Lemke, 2010, p. 264). The skills do not exist in isolation, as one is needed to participate in another. For instance, one must know how to communicate and use technology appropriately in order to collaborate with a group and present a creative or innovative solution to a problem. 21st century skills are neither taught nor learned in a vacuum. The Committee on Defining Deeper Learning and 21st Century Skills "recognize[s] that [21st century skills] are intertwined in human development and

learning" (National Research Council, 2012, p. 22). Individuals should master 21st century skills, but can learn and apply them in a collaborative setting while engaged in content-area learning such as science or history.

Evolving from discrete and specific research and technology skills, two leading education organizations, the American Association for School Librarians and the International Society for Technology in Education updated their student learning standards to guide teaching and learning in the new millennium. The Partnership for 21st Century Skills was formed as an advocacy organization focusing on the infusion of 21st century skills into education. It brings the education leaders and the business community together to "define a powerful vision for 21st century education to ensure every child's success as citizens and workers" (Partnership for 21st Century Skills, 2008, p. x). Additionally, the National Research Council was charged by several foundations to "help the public understand the research related to the teaching and learning of such [21st century] skills" by defining the set of skills; describing how they relate to more traditional skills and content in reading, science, and math; and summarizing the findings of extant research that investigates the importance of skills in adult life and the importance of developing these skills in K-16 formal education (National Research Council, 2012, p. 2).

Focusing on the development of four strands consisting of skills, dispositions, responsibilities, and self-assessment, the American Association of School Librarians *Standards for the 21st Century Learner* offers a "vision for teaching and learning," a way

to “shape the library program” and to “serve as a tool for school librarians to use to shape the learning of students in the school” (American Association of School Librarians, 2012). American Association of School Librarians standards require students to 1) “inquire, think critically, and gain knowledge;” 2) to “draw conclusions, make informed decisions, apply knowledge to new situations, and create knowledge;” 3) to “share knowledge and participate ethically and productively as members of our democratic society;” and 4) to “pursue personal and aesthetic growth” (American Association of School Librarians, 2007, pp. 4-7). Each of the standards includes a set of skills, dispositions in action, responsibilities, and self-assessment strategies that students should practice in context. The learning standards are a result of the Standards Committee’s review of national education standards in English, social studies, science, mathematics, and technology, and from examples of state frameworks and curriculum. In order to focus on the kind of pedagogy that would ensure all “students had the skills, responsibilities, dispositions, and self-assessments to move forward” (G. Dickinson, personal communication, June 8, 2012), committee members studied resources that focused on learning, critical thinking, instructional design, and looked for trends in futures documents, including the 21st century skills presented by Partnership for 21st Century Skills to develop the four strands. Gail Dickinson, a member of the committee and past American Association of School Librarians President stated in a personal communication,

> We also read in what now would be considered transliteracy, in that we were very deliberate about the different kinds of literacies that exist. One of the first decisions we made was that these were not going to be information literacy standards. That is just too limiting for the world that we [are] in." (June 8, 2012)

Another committee member explains the development of the four strands:

> In the end, once we took the time to read and discuss these materials, we put all of it away but certainly didn't forget what we learned. Then we asked the question: Based on what we know about the post high school expectations (work & college) of our students, what do they need to know about finding, using and sharing information? (Skills) During our conversations answering that question, we also decided that we needed to include what it would look like when students were performing those skills. (Dispositions & Responsibilities) Finally, we determined that our students don't naturally self-assess because we don't systematically teach it. So we included a strand on self-assessment. (C. Barnett, personal communication, June 23, 2012.)

International Society for Technology in Education's (2012) *National Educational Technology Standards for Students* are the ideals for assessing the "skills and knowledge students need to learn effectively and live productively in an increasingly global and digital world." They include creativity and innovation; communication and collaboration; research and information fluency; critical thinking, problem solving, and decision

making; digital citizenship; and technology operations and concepts. Each standard is accompanied by four related skills or actions. Even though an examination of the association's website standards and two email requests provided no information on the development of the student standards, they are included in the sensitizing concepts for this study because International Society for Technology in Education is the leading educational technology organization, representing more than 100,000 education leaders and emerging leaders worldwide. The standards are "widely recognized and adopted worldwide" to guide teaching and learning (The International Society for Technology in Education, 2012).

In response to the need for pedagogical change, the Partnership for 21st Century Skills offers the *Framework for 21st Century Learning* which "describes the skills knowledge and expertise students must master to succeed in work and life" and is a "blend of [discipline] content knowledge, specific skills, expertise and literacies" (Partnership for 21st Century Skills, 2009, p. 1). More comprehensive in scope than the American Association of School Librarians and International Society for Technology in Education standards for learning, the Partnership for 21st Century Skills framework consists of four general areas of competency, specific themes or skills for each area, and actions or understandings that are critical to demonstrating mastery for each theme or skill (omitted here):

- Core Subjects and 21st Century Themes includes English, reading or language arts; world languages; arts; mathematics; economics; science;

geography; history; and government and civics, in addition to global awareness; financial, economic, business and entrepreneurial literacy; civic literacy; health literacy; and environmental literacy.

- Learning and Innovation Skills encompasses creativity and innovation; critical thinking and problem solving; and communication and collaboration.
- Information, Media and Technology Skills consists of information literacy; media literacy; and information, communications and technology literacy.
- Life and Career Skills require flexibility and adaptability; initiative and self-direction; social and cross-cultural skills; productivity and accountability; and leadership and responsibility. (Partnership for 21st Century Skills, 2008, pp. 2-7)

To provide structure and support to educators, the framework includes 21st Century Education Support Systems that provide guidelines for Standards and Assessments, Curriculum and Instruction, Professional Development, and Learning Environments. From the Partnership for 21st Century Skills framework, educators often refer to the "four C's" when describing 21st century skills: collaboration, critical thinking and problem solving, creativity and innovation, and communication, even though the collective "21st century skills" encompasses a larger set of skills, competencies, and literacies.

The Partnership for 21st Century Skills framework's skills, expertise, and literacies come from an impressive list of what Bruno Latour (1988) refers to as "rhetorical devices of authority," or "allies in the form of references." Cited are studies and documents from technology corporations, K-12 education, higher education, and areas of economics, educational testing and statistics, census, and labor. It uses survey results from American Management Association, Commission on Growth and Development, Skills of the American Workforce, World Economic Forum, and the Committee on Science, Engineering, and Public Policy. Noted authors, journalists, experts, and policy makers works used to build the framework include Daniel Pink, David Brooks, Thomas Friedman, Sir Ken Robinson, and Ben Bernanke. (Partnership for 21st Century Skills, 2008, p. 17).

The Committee on Defining Deeper Learning and 21st Century Skills notes that there are many overlaps in published lists of 21st century skills and suggests that "[a]ligning the various competencies with extant, research-based personality and ability taxonomies illuminates the relationships between them and suggests a preliminary new taxonomy of 21st century competencies" (National Research Council, 2012, p. 36). To develop a framework and categorize accompanying skills, the Committee reviewed lists of 21st century skills included in eight recent significant reports, papers, and literature reviews. It proposes three domains of competence: cognitive, interpersonal, and intrapersonal and uses the term competency to indicate more than simply "knowledge and skills, but involving the ability to meet complex demands by drawing on and mobilizing

psychosocial resources (including skills and attitudes in a particular context)" (as quoted in National Research Council, 2012, p. 23).

Cognitive competencies and the accompanying terms for 21st century skills include:

- Cognitive processes and strategies: critical thinking, problem solving, analysis, reasoning/argumentation, interpretation, decision making, adaptive learning, executive function;
- Knowledge: information literacy (research using evidence and recognizing bias in sources), information and communications technology literacy, oral and written communication, active listening; and
- Creativity: creativity and innovation (National Research Council, 2012, p. 32).

Intrapersonal competencies and the accompanying terms for 21st century skills include:

- Intellectual openness: flexibility, adaptability, artistic and cultural appreciation, personal and social responsibility (including cultural awareness and competence), appreciation for diversity, adaptability, continuous learning, intellectual interest and curiosity;
- Work ethic/conscientiousness: initiative, self-direction, responsibility, perseverance, productivity, grit, Type 1 self-regulation (metacognitive

skills, including forethought, performance, and self-reflection), professionalism/ethics, integrity, citizenship, career orientation; and

- Positive core self-evaluation: Type 2 self-regulation (self-monitoring, self-evaluation, self-reinforcement), physical and psychological health (National Research Council, 2012, p. 33).

Interpersonal competencies and the accompanying terms for 21st century skills include:

- Teamwork and collaboration: communication, collaboration, teamwork, cooperation, coordination, interpersonal skills, empathy/perspective taking, trust, service orientation, conflict resolution, negotiation; and
- Leadership: Leadership, responsibility, assertive communication, self-presentation, social influence with others (National Research Council, 2012, p. 34).

The Committee concluded that "much further research is needed to clearly define the competencies at each level of the proposed taxonomy, . . . and to identify the most effective ways to teach and learn these competencies" (National Research Council, 2012, p. 36).

Researcher Sensitivity

After studying current research on the benefits and challenges that young people encounter in the participatory culture and the skills they gain through informal interactions with others through the new media ecology, I wanted to systematically study

the ways in which new media may support knowledge building and skills development. I needed to see if similar results could occur in formal education to provide empirical evidence that would offer a sound structure and theory to methods and tools advocated by innovative educators, but not often supported by traditional teachers and school administrators. Telling my story will explain how I developed a research question.

In 1994, the school district where I worked as an elementary school librarian sent me to a one week course at Syracuse University to study the Big6 process of information problem solving with Dr. Michael Eisenberg and Robert Berkowitz. It was from that 7-day course that I understood that "research" was not an out-of-context activity that teachers assigned once or twice a year after all of the subject-area content was taught and tested, but rather a way of thinking about learning as a problem to solve. The process turned the lecture and textbook into two of many sources in which students could use in their quest for the information that they might need to solve a problem or complete a task. Technology was used as means to an end—a resource to locate information and present results—not as the end itself. Throughout the ensuing years of collaborating with teachers to integrate the information problem solving process into their curricula (even if it was for end-of-unit research projects), traditional information sources for students, such as library books and encyclopedias, were gradually supplemented by static webpages. Progressive school librarians eagerly adopted the new information sources and we strived to incorporate them into our information literacy curriculum, teaching students how to access, use, and evaluate digital sources of information, alongside traditional library

resources. Word processing and Microsoft PowerPoint replaced hand-written reports and posters as the preferred method for delivering assignments.

From containing only static pages of information for students to consume, the Web evolved into a space with websites that allowed anyone with Web access to generate content and interact with others. I knew from attending educational technology conferences, reading research coming out of the MacArthur Foundation's Digital Media and Learning initiative, Pew Research Center's Internet Project and other scholarly and professional sources that young people were flocking to the new media ecology and learning from one another in a participatory environment. It was my belief that by developing curriculum that integrated technology and online new media tools into the curriculum in transformative ways, not just for the sake of using the technology, that we could transform teaching and learning at my school by blending the transformative new media with formal learning.

My interest in examining how new media support subject-area knowledge building and 21st century skills development evolved through those years of collaborating with innovative and progressive teachers at my school who were (and still are) willing to let me introduce tools such as *Delicious* (social bookmarking), *Google Docs* (document sharing), *Peanut Butter Wiki* (a shared website builder, now *PBWorks*), and *Blogger* (web logging—blogging—software) to their students to support learning of course objectives.

Facilitating the use of new media was not easy and required the teachers and myself to go to great lengths to ensure student privacy, convince a few skeptical parents,

encourage reluctant students to use the tools, and to involve students in meaningful summative and formal assessments. Not surprisingly, collaborations with teachers occurred only once or twice a year, and after each, teachers went back to traditional teaching methods. Observations of students at work indicated that most students enjoyed learning with their peers and engaging in projects using new media, as did the self-evaluations I had students complete after each project so that along with teachers, I could get a sense of students' attitudes about the project and data about skills they may have gained. One ninth grade history project had students create a proposal for a children's museum exhibit on Ancient Greek culture (see Appendix A for full lesson plan). The self-evaluation was typical of others that I had administered throughout the years when I collaborated with teachers on subject-area projects. When asked if they preferred project-based learning to lecture/textbook/test, students' responded overwhelmingly that they preferred projects. A typical response (on the museum project, as well as others):

> It was much better than a lecture, reading, and test because it was easier and a more active way to learn the information. I do better with hands on activities than a lecture, and I am not at all a good test taker. So this assignment was challenging in some ways because it was a little harder to understand what we were suppose to do, rather than having a lecture or a test telling us specifically what to do. If that makes sense.

Another question on the self-evaluation survey asked students about their groups' experience using *Google Docs* (online document sharing) during the project. These are some typical replies:

> I think our group used it in a good way. We used it to write down all of our ideas at first then together narrowed that down. Then we all chose separate topics in the main idea and as we researched we were able to add notes to the same document. Also if someone wanted to share a picture or a link they could just copy and paste it in and then all the teammates could see it or go to that link. It made it easier to work as a group.

> It was nice to be able to talk about what we were writing on the side chat box while actually typing, and highlighting, and making notes for the rest of the group to see. It was helpful because you could check to make sure that your partners were doing their part of the work. Also, if you found anything that might help someone else in your group you could post it easily so that they could see it. Essentially it made collaboration much easier for my group. I feel like it wouldn't work as well in groups where each person did not do equal work.

When asked what benefits students get from working with their classmates, many expressed similar sentiments as these students (on the museum project as well as others):

> I definitely love having team mates. It makes it easier to get a hold on the project and the subject. When you are [in] collaboration with your classmates on a project

> you can bounce ideas around and voice concern [until] the perfect project comes up. It makes it easier.

> In this project I was able to hear other opinions and new ideas that I would not have thought of on my own. We learn time management and learn information from each other not just from the teacher. When I collaborate, I feel like it helps a lot because it reminds me that I am not doing this project all by myself. There are others to help me if I get stuck on my part of the project.

While most students preferred project-based learning and working with groups of their peers supported by new media tools, a portion favored the traditional method of learning through the transfer of knowledge from their teacher and texts and formative assessment through end-of-unit tests and essays. These comments on the self-evaluation surveys characterize their attitudes:

> I prefer to learn with notes and lectures. Learning on my own was definitely a challenge, and I know that I will have to get used to that process as I grow older, but for the time being I like having a guided lesson plan, so I know I have solid notes for the test/quiz.

> I did prefer lectures or reading because we learned more altogether than on projects such as this. For example, I did not learn much about my Greek subject

than I could have learned with test(s), because there is also more motivation on a test to study.

I had to ask myself why teachers did not reform more of their pedagogy toward student-centered learning through problem- and inquiry-based methodologies. Was the extra work of planning, monitoring, and formulating alternative assessment worth the effort? Did it matter? That was what I asked myself about the use of new media in formal education and I did not know the answer. I wanted to answer that through my observations of student results and (mostly) positive attitudes toward its use, that yes, new media integration does support learning, but I could not say why. I had many questions: How can I persuade teachers that effective use of new media may support learning in ways that traditional instruction cannot, and that it just may be worth the effort? How can we change the attitudes of all students so that they understand that they are responsible for constructing their own learning without depending on a teacher and textbook to transfer it to them? How can I support teachers as they transform their teacher-centered classrooms and curriculum into places where students construct their learning from a variety of sources for a variety of audiences?

As long as there is a vast quantity of content to cover in a nine-month course, traditional methods of information transmission are here to stay. I wanted to understand if the learning young people gain from their interactions in the new media ecology could transfer to formal education in support of knowledge building, and which skills students

developed as they engaged with each other and subject content in collaborative online environments.

If using new media supported knowledge building and skills development in ways that traditional teaching methods did not, the empirical evidence might convince teachers and students that, yes, it is worth the extra effort.

Chapter Two: Reviewing the Literature and Framing the Study

Progressive educators advocate for "learning reform" which is proving to be strongly facilitated by digital media and the skills and competencies young people enjoy through their affiliations using online social networks and other participatory media in an informal setting (Gee & Hayes, 2011, p. 69; Ito et al., 2010; Ito et al., 2013; Jenkins, Purushotma, Weigel, Clinton, & Robison, 2006; Livingstone, 2009; Tapscott, 2009; Watkins, 2009). Many educators and education organizations are borrowing ideas for school reform from this new out-of-school system (Gee & Hayes, 2011, p. 69) and integrating new media tools and digital resources in the curriculum in innovative ways. While many educators may want to frame the discussion around the effective and innovative use of specific technologies in the classroom, the discussion needs to focus on how they may contribute to learning, literacy, and knowledge (Parker, 2010), and the possibilities those practices can have in education reform. Empirical evidence supporting the use of new media in formal education may influence policy makers, school administrators, and classroom teachers and librarians to incorporate new media in the curriculum as a strategy for school improvement. This study explored the extent that new media tools and resources may support knowledge building in high school subject areas and development of 21st century skills.

REVIEW OF RELATED LITERATURE

The place of the literature review in grounded theory research has long been disputed and misunderstood. Glaser & Strauss (1967) recommend delaying the review until analysis is completed in order to avoid importing preconceived ideas and imposing them on the data gathering and analysis. Delaying the review encourages the researcher to articulate his or her ideas (Charmaz, 2006, p. 165). Although the researcher may be passionate about a topic and probably has considerable background knowledge on it, it is suggested that he or she consider treating extant concepts as problematic and then look for the extent to which their characteristics are lived and understood, not as given in textbooks (Charmaz, 2006, p. 166). The researcher lets the material lie fallow until after he or she has developed categories and analyzed the relationships among them. It is then that the researcher begins to locate his or her work within the relevant literature. Corbin and Strauss (2008) suggest that in the grounded theory approach to methodology, it is "impossible to know prior to the investigation what salient problems or which relevant concepts will emerge from the set of data and that there is always something new to discover" and the researcher does not want to be so "steeped in the literature that he or she is constrained and even stifled by it" (pp. 35-36). However, grounded theory scholars recognize valid reasons that a prior familiarity with the scholarly literature can enhance the study, including:

1) deriving concepts from the literature to provide a source for making comparisons with the data as long as the comparisons are made at the property and dimensional level and are not used as data per se;

2) enhancing sensitivity to subtle nuances in data, not by entering the study with an entire list of concepts, but those that appear often in the literature and the data help to demonstrate their significance;
3) helping the researcher formulate questions for the initial semi-structured interviews and observations. Even though new areas will emerge during the study, it helps satisfy the Institutional Review Board's concern about lists of conceptual areas to be investigated and demonstrates overall intent of the research; and
4) stimulating questions during the analytic process. (Corbin & Strauss, 2008, pp. 37-38)

Researchers must also recognize the importance of reviewing the literature in order to discover if answers to the research question exist in the current literature.

Although a larger range of skills and concepts emerged through a grounded theory approach to the research problem, the following review of the literature explored how scholars have studied new media's influence on the development of the most commonly identified 21st century skills—collaboration, communication, creativity and innovation, critical thinking, and research and information literacy skills—delivered in traditional face-to-face high school classrooms.

Findings

Subject area knowledge building

Acquiring and applying new subject matter in a discipline or course such as history, science, health, or mathematics remains a primary function of education institutions. The accountability system of standardized testing relies heavily on assessing students' content knowledge. Few studies, however, assess content as acquired or supported through new media use in the classroom. Casey & Evans (2011) suggested that by "providing constructive feedback to one another about important concepts such as assessment, this opened the door to generating new knowledge" when using a Ning social network in high school classrooms (p. 8). Harel Caperton, Oliver, & Sullivan (2008) reported that the by creating "original interactive web-games with social and educational purpose," high school participants in the Globaloria project gained knowledge (p. 3).

Collaboration

Collaboration in schools can occur when members of a group work together on one or more steps of a process, usually initiated by a teacher. These steps include: identifying a problem or understanding the assignment, defining the task necessary to solve the problem or satisfying the requirements of the assignment, exploring a variety of strategies and resources for solving the problem including locating and using information, and showing their results by creating an appropriate product.

Larusson & Alterman (2009) suggest that "any computer-supported collaborative learning application combines a learning activity with a collaborative environment" and should serve as the "intersubjective space" requirement that adequately supports

cooperation among students—it is the "'glue' that holds the collaborative learning activity together . . . and makes possible the functioning of the group" (p. 371-372). The space must be sufficiently equipped so that students can collaboratively perform their learning task. In some activities, referred to as "tightly coupled activities," students must work closely together within a common problem space, "which requires a detailed common understanding of the status of the problem" (p. 372). "For other activities, 'loosely coupled activities,' students must connect with one another to create some common ground but do not necessarily have to jointly focus on, or produce, a specific product" (p. 372). The study's authors find that basic wiki technology—those features that are supplied with the free packages such as *PBWorks* and *Wikispaces*—works well in support of both types of collaborative activities, but often lacks enough features to fully support those "tightly coupled activities" that are common in school-related assignments. Custom-built wiki platforms add the needed components to produce more effective learning environments (p. 373).

Zhou & Agosto (2008) found that by using a proprietary chat tool, middle school students collaborated successfully in solving math problems, using it to clarify questions and obtain explanations, seek information from one another, and engage participation among group members (p. 2). High school students in a game design class using a proprietary game design system "significantly increased the frequency of engagement in . . . online team collaboration, creating with digital media, and surfing for information" (Harel Caperton, Oliver, & Sullivan, 2008, p. 33).

Ertmer et al. (2011) found that preservice teachers collaborating on a wiki-based assignment with international partners increased their confidence levels and expectations of success (p. 219). The participants noted the value in using the wiki technology and made concerted efforts to complete the assignment, even going beyond the requirements to make synchronous contact with their partners and used technologies that were not part of the assignment (p. 219). The students also stated that they would use the knowledge gained from the experience (both technology and in working with international partners) in future coursework or in professional and personal practice (p. 219-220). Bell, Zeng, & Harris (2011) also suggest that because wikis' can be created, shared and edited among multiple users, that wikis can "present an ideal opportunity for social learning in student groups" (p. 81).

While some studies provide evidence supporting youths' preference for learning and working socially and collaboratively, Head & Eisenberg's (2010) results show that when it came to using new media tools, more college students used an "application for document creation and sharing, such as *Google Docs* than they did online forums, photo-sharing sites such as *Flickr*, wikis (other than *Wikipedia*), and blogging for supporting course-related research tasks" (p. 23). They further indicate that up to 62% of students used "software solutions," including highlighting text on the screen and formatting citations for the "solitary management of course-related research tasks as opposed to Web applications for collaborating and working with other students," and even fewer students used virtual research environments, social bookmarking for sharing Websites, or

microblogging to manage tasks for course-related research (p. 23). Head & Eisenberg (2010) also found that relatively few students used "popular emergent technologies (e.g., *Flickr*, *Twitter*, *Delicious*) [to] shar[e] information and collaboratively work . . . on projects together during course-related research," but instead preferred to use tools such as word processing software with "on-screen highlighting feature or packages for managing bibliographic citations" (p. 23).

Not surprisingly, when students view their learning communities as transitory, as in most school-related assignments, this can "mitigate against the constructivist and collaborative approaches to instruction as the student is more engaged with their long-term social network than the short-term social network provided by the learning community" (Gasson & Agosto, 2008, p. 6).

Communication

Effective communication skills require one to clearly articulate thoughts and ideas through oral, written and nonverbal means, the ability to listen effectively to decipher meaning, and demonstrate the appropriate mode of communication (i.e. to inform, instruct, motivate, or persuade) (Partnership for 21st Century Skills, 2009, p. 4).

The few studies that articulated communication skills mainly focused on findings in support of written communication, suggesting that teens' lives are filled with writing. While teens may not necessarily think of their texts, blogs, emails, and social network posts as writing, 93% of teens write for pleasure and believe that the writing instruction they receive in school can be improved (Lenhart, Arafeh, Smith, & Macgill, 2008, p. vii).

A recent study from the Pew Research Center's Internet & American Life Project surveyed teachers about using blogging in the classroom and found limited but positive support for its use:

> While most Advanced Placement and National Writing Project teachers in the focus groups said they do not consider texting, blogging, or micro-blogging (posting on social network sites) "writing" in the traditional sense, they believe these digital formats do spur thinking and encourage communication among their students, which may lead to deeper thinking and self-expression. Several teachers in the study characterized these shorter online posts as "pre-writing" that may get a student engaged in a topic or discourse enough to want to write a longer piece about it or explore it further. In some teachers' eyes, these digital forms of expression are "building blocks" for lengthier, more formal writing. (Purcell, Buchanan, & Friedrich, 2013, p. 18)

Some young people develop creative and expository writing skills by crafting fan fiction and video game manuals. Through participation in the publishing of *The Daily Prophet*, a Web-based fictional newspaper for the school that the popular children's book character Harry Potter attends, young writers hone their craft by planning, writing, and editing stories for each issue (Jenkins, 2006, p. 180). Other Harry Potter fan fiction sites provide informal instruction to newer writers, offer a peer-review process, and host stories and novels in full or partial stages of completion by writers of all ages and nationalities (Jenkins, 2006, p. 188). Gee (2007) discusses the rigid guidelines to which

affinity group members must adhere when contributing to various user-generated online instruction manuals (p. 97). Casey & Evans (2011) discovered that as students communicated through a *Ning* social network on a class assignment it allowed them a "great deal of flexibility to read and write comments and to ask questions and seek clarification" (p. 7).

Ali (2012) found some evidence that new media tools can "diversify and broaden traditional online structures of communication in ways that non-Web 2.0 applications may not" (p. 529). For example, the dominant pattern of communication in online learning discussion forums tends to be a hub-and-spoke structure of facilitator (hub) and participants (spokes), with much or most of the discussion emanating to and from the facilitator. The facilitator poses a question, participants respond, and the facilitator acknowledges responses. The researcher asserts that this does not provide clear evidence that participants are becoming stronger communicators, just that they communicate more easily with professor and teachers (p. 529). In studying student engagement to promote student-centered learning environments, Rose & Gravel (2012) suggest that the use of new media in the classroom can "expand the lines of communication and collaboration for students across districts, states, and countries" (p. 20).

Creativity and innovation

Creativity can manifest itself in the process one uses to solve problems or carry out tasks, as well as in the product one offers as the result of the process. Innovation

relies on the creative process to produce something new to satisfy a defined or undefined need in a particular field.

Creative production in the digital age is the domain of young people. Lenhart, Madden, Macgill, & Smith (2007) found that two thirds of teens surveyed create content online. They create or work on a blog or personal webpage for school, a friend, or an organization and share original content such as artwork, photos, stories, or videos online or remix online existing content into a new creation (Lenhart, Madden, Macgill, & Smith, 2007, p. 2).

Chen and Bryer (2012) found that faculty "believed that students could exercise their creativity with images, audios, and video mashups" (p. 93). When given a choice of how to present and share their learning, middle school students created digital stories and essays, digital poetry, graphic novellas, digital docudramas and music videos, all using a variety of tools (Hughes & Burke, 2011, p. 583). Tripp & Herr-Stephenson's (2009) examination of middle school students found that while they enjoyed creating multimedia products, the "assignments offered limited opportunities to connect in-school learning to students' out-of-school literacies and interests" (p. 1203). Casey & Evans (2011) suggest that students' use of multimedia tools for projects encouraged them to be "creative while publishing their work for the Ning's [social network] wide audience, often giving them a reason to produce higher quality work" (p. 17).

Ito et al. (2010) found that outside the formal educational space, youth are developing photo, video, and music editing skills by sharing creations such as profiles

and hip hop music production, video blogs, and Harry Potter podcasting on *Flickr*, *YouTube*, *Photobucket*, and *MySpace* (pp. 243-293).

Critical thinking and problem solving

Critical thinking calls for learners to engage in sustained reasoning (Commission on Accreditation, 2010, p. 11) by inducing and deducing as appropriate to the situation, in addition to making judgments and decisions by analyzing, synthesizing, evaluating, and organizing evidence, arguments, claims and beliefs and making connections between information and arguments (Partnership for 21st Century Skills, 2009, p. 4).

The development of critical thinking skills takes practice and requires regular opportunities for learners to critique and reflect on their own learning, and the use of technologies like blogs and wikis can provide critical thinking opportunities for learners (Chen & Bryer, 2012, p. 93). A participant in Chen & Bryer's (2012) study reported that participants who use multiple tools in an integrated fashion can help students firm up their understanding [of subject-area content], and noted that "writing analytical blogs, publishing informed and thoughtful commentary on blog assignments and posing new questions in various threads to help integrate material/concepts/etc" (p. 93). Bell, Zeng, & Harris (2011) found that graduate students writing blogs learned the importance of embedding reference links in support of their arguments, and by reading and commenting on others' blogs, "both sets of learners learned to take an active role in formulating, expressing, and critiquing an argument" (p. 81). The same report suggests that undergraduates creating a presentation in a wiki environment learned to work as part of a

team in developing a final PowerPoint presentation as they practiced skills in "meeting deadlines, synthesizing content, evaluating and monitoring the quality of their work as well as in critiquing each other's work" (Bell, Zeng, & Harris, 2011, p. 81). Casey & Evans (2011) also found that students' critiquing abilities improved as they provided feedback to their peers' work through use of a Ning social network (p. 16).

Research and information literacy skills

Judging sources for relevant content.

In order to recognize that an information source offers an answer to a sought-after question or that it may help resolve an information need requires the cognitive ability to connect the need with the information presented. Students spend little time judging a source for relevancy, but when they do, some scan the graphics (Williams & Rowlands, 2007, p. 11) or skim text by viewing one or two pages from an academic site, possibly not returning to it (Rowlands et al., 2008, p. 297). Head & Eisenberg (2010) reported that students had the most difficulty filtering relevant from non-relevant sources and struggled to find the best sources to answer their personal questions and course-related research (p. 25, 27).

Evaluating sources for accuracy and authority.

Increasingly, studies seek to explore whether or not young people make a deliberate attempt to evaluate a source or have the skills necessary to do so. When asked, most students rate their online evaluation skills highly (Flanagin & Metzger, 2010, p. 28; Head & Eisenberg, 2009, p. 13; Van Scoyoc & Cason, 2006, p. 49). Gasson & Agosto

(2008) found that when researchers questioned what factors influenced their selection of electronic resources, the most common response given by undergraduates was credibility (p.6). Flanagin & Metzger (2010) tested children on "their ability to detect both good and bad information, and for the most part [the children] seemed able to do so, across both informational and commercial contexts (p. 104). Bowler (2010) found that even though the teacher and librarian warned students that *Wikipedia* was "not a reliable source" that the high school students relied on it anyway as a starting point for their research (p. 39).

In a large study of grade school students ages 11-18, Flanagin & Metzger (2010) found that an average of 75% of children surveyed believed that they should "think about" the credibility of information accessed via the internet and that others should do the same (p. 32). Almost a third of respondents reported that they or someone they knew had a bad experience due to false information found online, and over 60% reported hearing a news story to that affect (p. 37). When asked how likely children are to believe information found on the internet about various topics or types of information offered, on average students believed information "found for schoolwork, followed by news, then entertainment and health information, . . . commercial information, and information about people they met online," with general patterns enduring regardless of age (p. 39). When asked about the accuracy of information found in blogs, almost 80% of students found news blogs less believable than television news and newspapers (p. 41). The authors note that 37% of students answered "I do not know" when asked to compare the credibility of mainstream news and blogs, with 8% indicating that they did not know what a blog was

(p. 41). While not all children surveyed (22%) correctly identify what *Wikipedia* is, 84% have used it to look up information (pp. 42-43), and over 70% rate it to be "fairly believable" (p. 43). Children become more skeptical when determining if others should believe what they find on *Wikipedia* (p. 43). Depending on the type of information sought, children make credibility distinctions among technologies, with 39% believing a person before the internet or books for health or medical information, and 54% believing TV news before newspapers or internet (p. 45).

Students do not always value the information gained from their teachers and librarians as highly as they do friends and family, and print and digital sources. Hillyer, Parker, & Gilbert (2011) found that undergraduates rated information found via the library's catalog and article databases as high quality, while rating information received from *Google*, their instructor, and the librarians as medium quality (p. 231). In a large study of college undergraduates, 61% asked friends and family when evaluating sources for personal use and almost half sought help from instructors for help in choosing valid information relating to course assignments, with only 11% asking librarians for assistance (Head & Eisenberg, 2010, p. 3).

Young people who verify information found in extant sources use a variety of methods to determine credibility. Students suggested that Google aided in verifying information due to clustered websites that offered the "same information" (Head & Eisenberg, 2011, p. 8). Flanagin & Metzger (2010) report three methods that children engage to evaluate information: 1) they "carefully analyze the information and its

features," 2) "use a more holistic and intuitive approach based on feelings," and 3) "draw upon others in one's social circle for advice and guidelines" (p. 47). Across the types of studied information, students report the most essential "cues/elements involved the currency of the information, the security of the Web site, information completeness, and the authority of the information source" followed by "items that dealt with social endorsement and reputation" with Web site design and "general feelings about the Web site" as the least important (Flanagin & Metzger, 2010, p. 51).

Head & Eisenberg (2011) found that when students sought information for everyday life use, they most often evaluated it based on self-taught criteria (design, ease of use and broken links, ads for questionable products, and a site's familiarity) (p. 12). Students in this study also used traditional and formal standards (timeliness and authority) from the scholarly print world and librarianship by considering currency, authority, and the origin of a site's URL (p. 13). To a lesser extent did students use domain criteria specific to the internet such as a site's external links, and whether or not an author credited his sources or included a "bibliography of some kind" (p. 13). Thirty two percent of the students sampled reported difficulty evaluating sources, especially in determining credibility. This was true for personal use as well as course-related research (pp. 25, 27).

Flanagin & Metzger (2010) also compared the cues and elements that young people use to determine the credibility of various types of information individually such as health, news, entertainment, commercial, and school-related information, finding that

children reported that the following things were equally important in determining credibility in all types of information: reputation, endorsement, security, site design, and information plausibility (p. 53). Differences emerged on certain types of information such as expertise, endorsement, and lack of bias for health- and school-related topics and endorsement for commercial topics (p. 53). Students apply evaluative tools with "less rigor" when seeking entertainment information, with older youth "more likely to use heuristic, social, and analytic methods of assessing credibility simultaneously than are younger kids" (p. 56).

Additionally, the researchers discovered that the ways young people engage in the internet and create content affect their concern about credibility of information, but to a lesser extent than those who contribute less content and those who participate in virtual worlds (p. 62). Children highly skilled in online use as well as those who have a greater number of years of internet experience demonstrate the greatest concern about the credibility of online information (p. 63). "These results indicate that as kids engage more, and more deeply, with various aspects of the [i]nternet, they may develop a healthy sense of skepticism and concern about the believability of information available online" (p. 63).

Discussion

Findings from recent studies suggest that youth prefer to communicate, create, learn, and work collaboratively within the new media ecology (Dredger, Woods, Beach, & Sagstetter, 2010; Gasson & Agosto, 2008; Ito et al., 2010; Jenkins, Clinton, Purushotma, Robison, & Weigel, 2006; Lenhart, Madden, Macgill, & Smith, 2007;

Tapscott, 2009; Watkins, 2009; Zhou & Agosto, 2008). With the public's call for education reform and the suggestion that new media may offer affordances for learning that traditional resources lack, surprisingly few studies exist that examine how new media may support subject-area knowledge building and 21st century skills development in a formal high school setting.

Empirical evidence suggesting that new media support students' ability to build knowledge in high school subject areas remains thin. Casey & Evans (2011) suggest that by "providing constructive feedback to one another about important concepts such as assessment, this opens the door to generating new knowledge" (p. 8). Harel Caperton, Oliver, & Sullivan (2008) reported that the by creating "original interactive web-games with social and educational purpose" that high school participants in the Globaloria project gained knowledge and skills. But they stopped short in providing details of possible subject-area content acquired through the study.

Studies supporting new media's influence on developing essential transferable skills in grade school students provide valuable but limited evidence (Casey & Evans, 2011; Flanagin & Metzger, 2010; Harel Caperton, Oliver, & Sullivan, 2008; Hughes & Burke, 2011; Tripp and Herr-Stephenson, 2009; Zhou & Agosto, 2008).

Several studies show tentative evidence that the participatory online environment influences the information behaviors of youth (Gasson & Agosto, 2008; Head & Eisenberg, 2009; Rowlands et al., 2008; Van Scoyoc & Cason, 2006), but none of the studies reviewed have actually examined the full range of information literacy skills as

detailed in chapter one, and not all studied young people's perceptions of credibility within the new media ecology.

Due to the lack of empirical studies examining high school students' use of new media in the formal educational setting, I reviewed studies that examine college students use of new media in everyday or school-related tasks (Bell, Zeng, & Harris, 2011; Ertmer et al., 2011; Gasson & Agosto, 2008; Head & Eisenberg, 2009, 2010, 2011; Hillyer, Parker, & Gilbert, 2011; Larusson & Alterman, 2009; Reid & Anderson, 2011; Rowlands et al., 2008; Van Scoyoc & Cason, 2006). These offered limited evidence of skills development but can be used for the purpose of the literature review within a grounded theory study.

None of the studies examined explored the manners in which new media may or may not support knowledge building in high school subject areas, nor were any of the studies examined designed to determine how the use of new media may bolster the development of 21st century skills.

Limitations of Literature Review

While some studies offer promising findings, one must weigh possible problems. One limitation of this review is the scarcity of studies that actually examined how high school students gain subject area knowledge and develop skills through the use of new media in formal educational settings. Most studies do not lend themselves to comparison due to the small number of participants involved in each study. While many studies suggested new media's support of knowledge building or skills development, none

assessed the quality or effectiveness of the skills nor the deep learning gained. None provided detailed evidence as to the manner in which the new media supported knowledge acquisition and application or skills practice or mastery.

THEORETICAL FRAMEWORK

Like other student and experienced researchers before me, symbolic interactionism provided a theoretical framework for contextualizing my own world views and analyzing the findings of a constructivist grounded theory study of a topic that has little support in the scholarly literature. Charmaz (2006) allows that the theoretical framework "emerges from your analysis and argument about it" (p. 169). This study takes a symbolic interactionist perspective on participation and perception (Atkinson & Housley, 2003; Blumer, 1969; Charmaz, 2006; Corbin & Strauss, 2008; Pascale, 2011; Stryker & Vryan, 2006) and builds upon the conceptual literature in the participatory culture and new media ecology (Jenkins, Purushotma, Weigel, Clinton, & Robison, 2006; Ito et al, 2010; Ito et al., 2013) explicated under synthetizing concepts in chapter one. Denzin (2004) explains that "*symbolic*" in the phrase symbolic interaction refers to "the underlying linguistic foundation of human group life, just as the word *interaction* refers to the fact that people do not act toward one another, but interact with each other" (pp. 81-82). A simple explanation of symbolic interactionism, offered by Charmaz (2006), defines it as a theoretical perspective "derived from pragmatism, which assumes that people construct selves, society, and reality through meaning and actions" and "addresses the active processes through which people create and mediate meanings" (p. 189).

Meanings emerge from actions and in turn, influence actions. “This perspective assumes that individuals are active, creative, and reflective and that social life consists of processes” (Charmaz, 2006, p. 189). Pascale (2011) explains that symbolic interaction came about as an “effort to understand social life through something other than laboratory research and behaviorist conceptions of stimulus–response” and “[c]onsequently it shifted the goal of social research from an objective study of an empirical reality to a deep understanding of the symbolic practices that make a shared reality possible” (Pascale, 2011, p. 78).

Herbert Blumer, the leading symbolic interactionist of his time and whose work is largely based on his sociological interpretation of the theories of Herbert Mead (Pascale, 2011, p. 87), offers three premises on which symbolic interactionism rests. First, people act toward things on the basis of the meanings that those things have for them (Blumer, 1969, p. 2). Things can be represented by anything in the human’s world including physical objects, other people, categories of people, institutions, guiding ideals, activities of others, or any situation a person may encounter in his or her daily life. A tree may be a sacred object for one person, lumber for another, or a botanical species for a third. “Each person will act toward the tree on the basis of the meaning it holds for him or her” (Pascale, 2011, pp. 87-88).

Second, meaning is derived from, or arises out of, the social interaction one has with other people. The meaning of a thing for an individual develops from the ways in which other people act toward the person with respect to that thing. Meanings are social

products, “formed in and through the defining activities of people as they act” (p. 5). The basis of meaning for symbolic interaction is collective; it is not individually decided nor is it inherent to objects (Pascale, 2011, p. 88).

Third, “these meanings are handled in, and modified through, an interpretive process used by the person in dealing with the things he encounters” (Blumer, 1969, p. 2). The actor has to communicate to him or herself the things to which he or she is acting and by the nature of this process of communicating to self, “interpretation becomes a matter of handling meanings” (p. 5). Meanings become formative in nature and are “used and revised as instruments for the guidance and formation of action” (p. 5), and in the process of self-indication, he or she may come to suspend, regroup, or transform meanings (Pascale, 2011, p. 88). Summarily, one must “see that meanings play their part in action through a process of self-interaction” (Blumer, 1969, p. 5).

Blumer asserts that the “central place and importance of symbolic interactionism is in human group life and conduct should be apparent” (p. 10). A society or group consists of people in association—people acting toward one another and therefore engaging in social interactions (p. 10).

> Such interaction in human society is characteristically and predominantly on the symbolic level; as individuals acting individually, collectively, or as agents of some organization encounter one another they are necessarily required to take account of the actions of one another as they form their own action. (p. 10)

I identified various groups in the study: large groups forming a whole class (AP Art History, English 12, and Latin II) and small groups (students in the other classes who worked on projects in small groups of two to four students). As they participated online (and in some instances in person) through the use of new media, they took account of the actions of one another and modified their own actions through a broadened perspective of the subject matter and attention to self-presentation.

Based on Blumer's categorizing of "things," the use of new media is a situation one may encounter in daily life as students recognize the contributions of, and collaborate with, their classmates. Meaning is derived from, or arises out of, the interpretations that students make of their classmates' contributions and their interactions with each other through the use of new media tools remotely and in person. The social interactions a student has with his or her classmates are what construct the defining activities of the students and the meaning of the usefulness of new media. Actions include making one's response to assignments available for others to review, remotely editing a document with others in the group, monitoring group members' progress and contributions to a group project, or chatting in real time while editing from remote locations. Students handle or modify these meanings through an interpretive process by communicating to self, and use the meanings as instruments to guide or form action. A student uses the contributions of his classmates to make changes in the direction he takes the same assignment. Considering that her classmates may judge her contributions to an assignment, a student increases the effort it takes to contribute a worthy response. Based on the interaction of

the text offered by his classmates, a student revises his perceptions of subject-matter content. While editing in real time online, a student rethinks her contribution to the group and makes necessary adjustments for her classmates to review.

How does the researcher find out what is happening within the defined social groups and the meanings they construct through their interactions with each other? "As a qualitative interpretive framework, symbolic interaction is dependent on the procedural techniques of . . . grounded theory" and "grounded theory . . . rel[ies] on inductive logic and empirical evidence in localized contexts" (Pascale, 2011, p. 88). Common methods of study for symbolic interactionists include participant observation, unstructured interviews, and textual and visual media analyses (Pascale, 2011, p. 88). I conducted and analyzed semi-structured interviews, observed and analyzed the interactions of participants (both in the field with new media and with each other) and examined and analyzed many texts, including the interactions and manners of use that students made of new media in the course of formal educational requirements to co-construct meaning from things and interactions with others.

METHODOLOGY: CONSTRUCTIVIST GROUNDED THEORY APPROACH

Constructivism

Constructivism, often used interchangeably with interpretivism (Merriam, 2009, p. 9) is a social scientific paradigm that addresses how realities are made. Those who practice the approach referred to as interpretive constructivists (Rubin & Rubin, 2005, p. 28). It assumes that people, including researchers, construct the realities in which they

participate and assumes that there is no single, observable reality but multiple realities or interpretations of a single event (Merriam, 2009, p. 8). Rather than looking for the average and ignoring the specific as with a typical positivists' approach, interpretive constructivist researchers "look for the specific and detailed and try to build an understanding based on those specifics" (Rubin & Rubin, 2005, p. 28). They are not interested in averages or what is typical, but in "syntheses of understandings that come about by combining different individuals' detailed reports of a particular event or cultural issue" (Rubin & Rubin, 2005. p. 27).

Constructivist inquiry starts with the experience and asks how members construct it. To the best of their ability, constructivist researchers enter the phenomenon, gain multiple views of it, and locate it in its web of connections and constraints. Constructivist researchers acknowledge that their interpretation of the studied phenomenon is itself a construction and understand that multiple and even conflicting versions of the same event or object can be true at the same time (Rubin & Rubin, 2005, p. 27). The researchers do not need to put aside their cultural assumptions and assume those of the participants, but they do need to be aware of their positionality, or reflexivity—"reflecting critically on the self as researcher" (as quoted in Denzin & Lincoln, 2003, p. 283), in order to hear the meaning of what the contributors say and without letting their own assumptions and beliefs get in the way (Charmaz, 2006; Rubin & Rubin, 2005).

Grounded Theory

In basic grounded theory, analysis assumes an inductive stance and strives to derive meaning from the data so that the end result is a theory that emerges from—"grounded in"—the data (Charmaz, 2006, p. 2). The methods used consist of gathering rich data, then coding and categorizing the data using the constant comparative method, resulting in developing broad concepts from which a substantive theory is produced. The substantive theory has as its reference specific everyday situations, such as the coping mechanisms of returning adult workers, or the means by which young people develop transferable skills in the new media ecology. It has a specificity, and hence a usefulness, to practice that is often lacking in more global theories that may benefit practicing educators. Objectivist grounded theory resides in the positivist tradition. It thus attends to data as real in and of themselves and does not attend to the processes of their production (Charmaz, 2006, p. 131). A researcher employing this perspective assumes that "data represent objective facts about a knowable world" and the "data already exist in the world," and an unbiased observer finds them and 'discovers' theory from them," and produces a theoretical understanding by careful application of methods (Charmaz, 2006, p. 133). Objectivist grounded theorists remain "separate and distant" from the participants and their realities and claim "value-free positions," assuming the role of "authoritative experts who bring an objective view to the research" (Charmaz, 2006, p. 132). Researchers applying a constructive perspective to grounded theory methodology cannot dismiss "scrutiny of . . . [their] values by claiming scientific neutrality and

authority," but rather are obliged to be reflexive about what they bring to the scene, what they see, and how they see it (Charmaz, 2006, p. 15).

Constructivist Grounded Theory

A constructivist grounded theory adopts grounded theory guidelines from its earlier formulations as tools but does not subscribe to the objectivist, positivist assumptions of the earlier formulations. A constructivist approach focuses on exploring the phenomenon of study and sees both data and analysis as created from shared experiences and relationships with participants and other sources of data, including observation and document analysis. Constructivist grounded theory "lies squarely in the interpretive tradition" (Charmaz, 2006, p. 130), not the positivist. Constructivist grounded theorists take a reflexive stance toward the research process and products, consider how their theories evolve, and assume that both data and analyses are social constructions that reflect what their production entailed (Charmaz, 2006, p. 131). Any analysis is contextually situated in time, place, culture, and situation, which means giving close attention to empirical realities and our collected renderings of them, *in addition to* locating oneself in these realities (Charmaz, 2006, p. 131). It does not assume that data simply await discovery in an external world or that methodological procedures will correct limited views of the studied world, nor does it assume that impartial observers enter the research scene without an interpretive frame of reference (Charmaz, 2006, p. 132). Instead, what observers see and hear depends upon their prior interpretive frames, biographies, and interests as well as the research context, their relationships with research

participants, concrete field experiences, and modes of generating and recording empirical materials. No qualitative method rests on pure induction—the questions we ask of the empirical world frame what we know of it. In short, we share in constructing what we define as data.

Charmaz (2006) takes into account the "pragmatist antecedents" of grounded theory rooted in positivism and Chicago school sociology, and recognizes the "rigor and its reliance on emergence" that those philosophies brought to the approach (p. 183). She suggests that a constructivist grounded theory "retains the fluidity and open-ended character of pragmatism as evidenced in Strauss's works and those influenced by him" and adds that "you follow the leads in your data as you see them, as in typical grounded theory practice, but that constructivist grounded theory takes you one step further" (p. 184). The "vantage points," and their implications, of all participants, including the researcher, "are made explicit in order to help the researcher remain clear about the antecedents of . . . [the resultant] constructed theory" and "help other researchers and policy-makers to establish the boundaries of the usefulness of . . .[the] grounded theory and possibly to ascertain how and where to modify it" (p. 184). A researcher who holds "constructivist sensibilities . . . may learn and interpret nuances of meaning and action while becoming increasingly aware of the interactive and emergent nature of . . . data and analyses" and construct an *interpretive rendering* of the worlds we study rather that an external reporting of events and statements" (p. 184). The constructive grounded theory approach intends to convey "emergent understanding rather than testable theory"

(O'Connor, Netting, & Thomas, 2008, p. 32). It is particularly useful for addressing questions about process, such as information behaviors. Its use is supported by Ellis (1993), a noted information theorist, who suggests that the grounded theory approach to research is a step toward building more accurate models of information-seeking, which is an essential skill in the new media ecology.

The constructivist grounded theory approach informed the research question by exploring specifically *how* new media support subject-area knowledge building and skills development in formal secondary education, and provided guidance for teaching and learning with new media. It was critical to the findings that participants serve as co-creators in interpreting data in order to determine the extent that new media support knowledge building and skills development.

Chapter Three: Designing a Study of New Media Support in Formal Learning

SIGNIFICANT METHODOLOGICAL PROCEDURES

The manner in which young people interact with new media in the informal participatory environment deviates from the traditional educational pedagogy, and this required a different approach to studying these behaviors. Determining how new media may support learning requires a methodology that allows the researcher to follow emergent leads and uncover rich, descriptive data that suggest how young people and their teachers use online tools to support knowledge building and skills development. Due to a lack of substantive theory or conceptual framework supporting the use of new media in formal secondary education, the constructive grounded theory methodology offered the most effective methods for exploring my research question. This is because this methodology helped determine the factors involved in learning with new media, what students actually gained from participation, and how the uses of new media support knowledge building and skills development. Ultimately, it provides a set of guiding principles that educators can practice for effective integration of new media in specific formal educational settings.

The research question—***How can the use of new media in high school curricula support subject-area knowledge building and development of 21st century skills***—necessitated exploring the support new media integration in formal secondary school subject-area curriculum may have on knowledge building and skills development. These inquiries were not included in established theories, models, or conceptual frameworks

surrounding the new media ecology. In support of employing a constructive grounded theory approach to the methodology, the concepts derived out of Ito et al. (2010) suggest that young people and new media alter established ways of learning and knowing. This further suggests that trying to impose traditional learning theories in the theoretical framework that informs the methodology may artificially alter the findings and conclusions.

Chen & Breyer (2012), finding "relatively limited research on pedagogies of using social media," used qualitative methods to "explore the research questions through rich descriptions and explanations" (p. 88). A constructivist grounded theory approach to the study prevented the constraints of a theoretical framework and predetermined categories of analysis, and allowed me to study the selected issue in depth and detail, resulting in complexity, openness, and rich detail of the inquiry. This was a suitable method for constructing a picture and explanation of process that is grounded in authentic practice. I selected this approach because I set out to understand from the teachers' and students' perspective how, or if, new media support gaining knowledge in a subject area and developing essential skills, and the implications that the results can have on teaching and learning. Data collection occurred through teacher and student interviews, observations, and course-related document analysis. Data analysis consisted of transcribing interviews, initial coding, focused coding, memo writing, and developing concepts.

Data Collection Methods Overview

Qualitative research, including grounded theory, involves the studied use and collection of a variety of empirical materials including interview, observation, and document analysis that "describe routine and problematic moments and meanings in individuals' lives" (Denzin & Lincoln, 2005, p. 5). Qualitative researchers deploy a wide range of "interconnected interpretive practices," hoping always to get a better understanding of the subject matter at hand. Unlike conventional methods of sampling, the researcher does not go out and collect the entire set of data before beginning the analysis. I began analyzing interviews as soon as each was conducted. Data collection led to analysis. Analysis led to concepts. Concepts generated questions. Questions led to more data collection so that I might learn more about those concepts. The circular process continued until I reached the point of saturation—the point when all concepts were well defined and explained (See Figure 3.1).

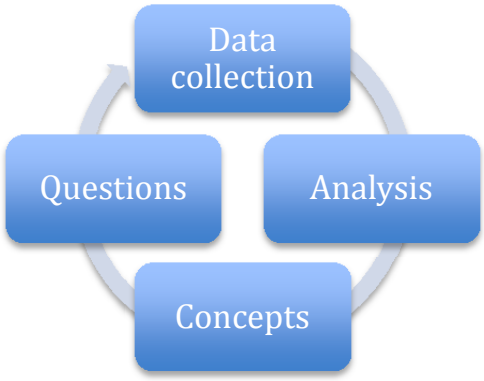


Figure 3.1: Circular process of data gathering and analysis.

SITE AND PARTICIPANT SELECTION

A grounded theory approach to methodology places emphasis on actions and processes, not on individuals, as a strategy in constructing theory and "moving beyond categorizing types of individuals" with categories resulting from "people's objectives and actions rather than being pinned to certain individuals" (Charmaz, 2006, p. 136).

The target population needed for the proposed study included high school teachers who use new media tools and resources in their curriculum, either on an ongoing or occasional practice, as well as students in the classes of these teachers. I used a set of volunteers from Independent High School in Austin, Texas, selected out of convenience. Corbin & Strauss (2008) state that convenience sampling is the "method used most often by beginning researchers" (p. 153) and that the researcher "should make the most out of what is available to him or her" (p. 155). Comparisons are continuing to be made on concepts during analysis—"[i]t is just that the researcher must accept what he or she collects rather than being able to make choices of who and/or where to go next" (Corbin & Strauss, 2008, p. 153). In grounded theory methodology, sampling is aimed toward theory construction, not for population representatives (Charmaz, 2006, p. 6).

Like most independent schools, Independent High School is not subject to the same policy restrictions as our public counterparts, such as *No Child Left Behind* accountability requirements, and the *Children's Internet Protection Act* internet filtering requirement. Therefore, independent schools can be rich sources of unobstructed information that may result in purer findings. Independent High School has 400 students and 55 classroom teachers. The traditional curriculum offers courses in the humanities

(English and history), math, science, languages, the arts, and athletics. The admissions office recruits students of color and diverse backgrounds in an effort to diversify the student body. Over twenty percent of the student population receives financial aid to defer the cost of tuition. Students come from 50 different zip codes in the local area.

STUDY DESIGN

Sampling

To address the initial research question and to meet the specific purposes of the study, I used purposive sampling to select teachers who were using new media in upcoming projects. Purposive sampling is not about representation of larger population but about concepts and looking for incidents that shed light on them. It looks for variation, not sameness, because in theory building it increases the broadness of concepts and scope of the theory (Corbin & Strauss, 2008, p. 156). Theoretical sampling, usually occurring later in the process to fill in gaps and collect additional information to follow up on an idea, is concept driven, "allowing researchers to discover the concepts that are relevant to this problem and population, and allows researchers to explore concepts in depth . . . [and is] especially important when studying new or unchartered areas because it allows for discovery . . . [and] enables researchers to take advantage of fortuitous events" (Corbin & Strauss, 2008. P. 145).

I recruited six faculty volunteers who frequently integrate new media into specific assignments. Three teachers, who were using new media throughout their courses, were added later. The initial faculty selected included three ninth grade History teachers, the

teacher of the trimester-long Anatomy and Physiology elective for juniors and seniors, the teacher of the Environmental Science elective for juniors and seniors, and the Latin II teacher. Teachers signed Consent Forms agreeing to their participation in the study (See Appendix B). As the school's librarian, the History, Anatomy and Physiology, and Environmental Science teachers had asked me to help with their last projects, which is a common request. I helped with planning the sources of information that the students might use and the methods students would use to present their results. I did not have any part in the assessment of student work.

For the four subjects, I addressed each class and asked for volunteers to sit for interviews, allow me to observe their class work, and to examine any documents that they would generate for the project. Once the students volunteered, I emailed an explanation of the study (See Appendix C) and the Parent/Student Consent Form (See Appendix D) to their parents and copied the students, teachers, and the high school principal. Twelve students in the ninth grade History class, seven in the Latin II class, five in the Anatomy and Physiology class, and ten in the Environmental Science class returned the signed forms. I contacted each student and teacher to schedule an interview after the assignment was complete.

During the process of interviewing individual students, some mentioned other classes—Advanced Placement Art History and English 12—in which they were also using new media, not for a specific project, but throughout the duration of the course. I theoretically sampled those teachers and additional members of the AP Art History and

English 12 classes to fill in gaps in the data. I contacted those teachers and secured their permission for an interview and to interview other students in their classes. Once several students agreed, I emailed a similar explanation of the study and the Parent/Student Consent Form to the parents and copied the students, teachers, and school administration. A total of 31 students (see Table 3.1) and nine teachers (see Table 3.2) participated in the study. Several students were in more than one class. To protect the privacy of students and teachers, pseudonyms were used in place of real names.

	AP Art History	Anatomy and Physiology	Environmental Science	English 12	History 9	Latin II
Arianne	✓	✓		✓		
Abby	✓		✓			
Ben			✓			
Braden						✓
Breelyn						✓
Bryan			✓			
Cady			✓			
Callie					✓	✓
Carson					✓	
Carter					✓	
Elena	✓	✓				
Heath					✓	✓
Harriet	✓					
Iris					✓	
Janice					✓	
Juana			✓	✓		
Karen					✓	✓
Karol					✓	
Kendra	✓		✓	✓		
Kim	✓	✓				
Malia					✓	
Mandy	✓		✓	✓		
Olga		✓				
Padman					✓	✓
Param					✓	✓
Pierce	✓					
Prince			✓			
Reece					✓	
Reina			✓			
Rylie	✓	✓		✓		
Sally	✓		✓			
Total	11	5	10	5	12	7

Table 3.1: Students and classes in which they participated

	AP Art History	Anatomy and Physiology	Environmental Science	English 12	History 9	Latin II
Maryann Roberts	✓					
Jack Owens		✓				
Diane Tobler			✓			
Kate Harper				✓ Co-teacher		
Carlyn Parker				✓ Co-teacher		
Jerry Fletcher					✓	
Rick Knight					✓	
Jackie Kemp					✓	
Nick Mann						✓

Table 3.2: Teachers and class assignments

My guiding interests about the manner in which new media use in high school curriculum supports knowledge building and skills development leads to bringing sensitizing concepts like participatory culture, new media ecology, and 21st century skills into the study. I used sensitizing concepts as *points of departure* to form interview questions, to look at data, to listen to interviewees, and to think analytically about the data. My guiding interests, sensitizing concepts, and disciplinary perspectives provided me with these points of departure for developing, not limiting, my ideas. Sensitizing concepts and disciplinary perspectives provide a place to start, not to end. Development of specific concepts occurs in studying the data and examining ideas through successive levels of analysis. (Charmaz, 2006, pp. 16-17). The proposed study adopts grounded theory coding as defined by Charmaz (2006) as the method of data analysis.

I gathered data from four sources in order to triangulate the exploration of how new media may support knowledge building and 21st century skills development in high school courses: student and teacher interviews, field notes from classroom observations of students using new media to satisfy requirements of specific assignments, curriculum maps for the courses studied, and the elicited texts that resulted from teachers and students—the documents created by the teachers while planning the project, and those created by students while engaged in the process, as well as the final products submitted as the requirements of assignments. These specifically include *Google Docs* shared documents that groups used for note taking, script writing, task planning, and any other information needed for projects in History 9, Anatomy and Physiology, and Environmental Science; the final products (historical personal journal entries for History 9, sports training guide website for Anatomy and Physiology, public service announcement videos for Environmental Science, Roman Emperor *Twitter* feeds for Latin II, *Tumblr* blog posts for English 12, and individual pages on a *PBWorks* wiki for AP Art History); and assignments from the teachers. Data collection began with the first interviews and continued with classroom observations and additional interviewing. During this time I gathered any documents that would help with theoretical sampling and triangulating evidence.

New Media Examined in Study

Specific new media examined in study includes *Google Docs* (shared documents), *PBWorks* (wiki), *Tumblr* (blog), and *Twitter* (microblog). *Wikipedia* offers comprehensive explanations of these online services.

Google Docs is a freeware web-based office suite offered by *Google* within its *Google Drive* service. It also was a storage service but has since been replaced by Drive. Documents, spreadsheets, and presentations can be created with *Google Docs*, imported through the web interface, or sent via email. Documents can be saved to a user's local computer in a variety of formats. Documents are automatically saved to *Google's* servers to prevent data loss, and a revision history is automatically kept so past edits may be viewed (although this only works for adjacent revisions, and there is currently no way to find and isolate changes in long documents). Documents can be tagged and archived for organizational purposes.

Google Docs serves as a collaborative tool for editing documents in real time. Documents can be shared, opened, and edited by multiple users simultaneously. Users cannot be notified of changes, but the application can notify users when a comment or discussion is made or replied to, facilitating collaboration. There is no way to highlight changes made by a particular editor in real time during a writing session, nor is there a way to jump to the changes made. However, an editor's current position is represented with an editor-specific color/cursor, so if another editor happens to be viewing that part of the document they can see edits as they occur. Also, the revision history included in the service allows users to see the additions made to a document, with each author

distinguished by color, but the entire document must be manually searched to find these changes. The revision history feature only displays one edit at a time, i.e. only adjacent revisions can be compared, and users cannot control how frequently revisions are saved. (Wikipedia, "*Google Docs*")

PBWorks is a commercial service that provides free and fee-based wiki creation. A wiki is usually a web application, which allows people to add, modify, or delete content in collaboration with others. Text is usually written using a simplified markup language or a rich-text editor. While a wiki is a type of content management system, it differs from a blog or most other such systems in that the content is created without any defined owner or leader. Wikis have little implicit structure, allowing structure to emerge according to the needs of the users. A wiki enables communities to write documents collaboratively, using a simple markup language and a web browser. Different from shared documents such as those created using *Google Docs*, wiki pages can only be edited by one person at a time. A single page in a wiki website is referred to as a "wiki page," while the entire collection of pages, which are usually interconnected by hyperlinks, is "the wiki."

A wiki is essentially a database for creating, browsing, and searching through information. A wiki allows non-linear, evolving, complex and networked text, argument and interaction. A defining characteristic of wiki technology is the ease with which pages can be created and updated. Generally, there is no review before modifications are accepted. Many wikis are open to alteration by the general public without requiring

registration of user accounts. Many edits can be made in real-time and appear online almost instantly. This can facilitate abuse of the system. Private wiki servers require user authentication to edit pages, and sometimes even to read them. (Wikipedia, "*PBWorks*" and "Wiki")

Twitter is an online social networking and microblogging service that enables users to send and read "tweets," which are text messages limited to 140 characters. Registered users can read and post tweets, but unregistered users can only read them. Tweets are publicly visible by default, but senders can restrict message delivery to just their followers. Users may subscribe to other users' tweets—this is known as *following* and subscribers are known as *followers.* Users have the capability to block those who have followed them. The tweets are restricted to a 140-character limit for compatibility with SMS messaging, introducing the shorthand notation and slang commonly used in SMS messages. *Twitter* messages are public but users can also send private messages. Users can group posts together by topic or type by using of hashtags—words or phrases prefixed with a # sign. The retweet function allows a user to repost a message from another *Twitter* user and share it with one's own followers. (Wikipedia, "*Twitter*")

Tumblr bills itself as a microblogging platform and social networking website, but allows for lengthy posts as in regular blogging. The service allows users to post multimedia and other content to a blog. Users can follow other users' blogs, as well as make their blogs private. bsiteMuch of the website's features are accessed from the "dashboard" interface, where the option to post content and posts of followed blogs

appear. A blog (a truncation of the expression web log) is a discussion or informational site published on the World Wide Web and consisting of discrete entries ("posts") typically displayed in reverse chronological order (the most recent post appears first). A majority is interactive, allowing visitors to leave comments on the blogs, and it is this interactivity that distinguishes them from other static websites. In that sense, blogging can be seen as a form of social networking service. Indeed, bloggers do not only produce content to post on their blogs, but also build social relations with their readers and other bloggers. A typical blog combines text, images, and links to other blogs, Web pages, and other media related to its topic. The ability of readers to leave comments in an interactive format is an important contribution to the popularity of many blogs. (Wikipedia, "*Tumblr*" and "Blog")

Classes and Assignments

Chosen based on their often or occasional use of new media in instruction and learning, nine teachers teaching six classes agreed to assist in the study. Their classes and projects examined for this study are described below. Teachers of Anatomy and Physiology, Environmental Science, History 9 (three teachers), and Latin II agreed to participate before study began. Teachers of the AP Art History and English 12 classes (two co-teachers) agreed to participate after I found out in the course of student interviews that those teachers were using new media in their classes. The course descriptions are taken from Independent High School's website.

Advanced Placement Art History: The AP Art History Class, an elective open to juniors and seniors, is a challenging, college-level course. Students acquire tools that enable them to be conversant about any piece of art they encounter for the rest of their lives. They master how to approach a work of art, the vocabulary and analytical methods with which to discuss it, and the knowledge of how it fits into the general sweep of art historical periods and styles. The class also works toward achieving an understanding of the interconnectedness of art with other aspects of world culture. By giving "voice" to works by lesser-known artists and from unfamiliar cultures, the class aims to develop as broad as possible of a perspective about and appreciation for both European-based and non-Western art.

The assignments examined for the study involved only those in which students posted on their individual wiki pages of the class *PBWorks* wiki. The five separate assignments, completed throughout the year, consisted of analyzing published cartoons based on notable art masterpieces or other works of art while adhering to specific guidelines; creating original cartoons based on masterpieces or other works of art; analyzing two of the original cartoons of classmates, adhering to the same guidelines in the first assignment; and the last two assignments have the students watching and analyzing music videos inspired by or based on works of art, again adhering to specific guidelines and criteria. I did not participate in the development of these assignments, nor did I observe students working on them. I interviewed the instructor and students and examined course-related documents.

Anatomy and Physiology: The Anatomy and Physiology is an inquiry-based, trimester-long elective course offered to juniors and seniors that provides a general understanding of human body systems and their interactions. Students learn general anatomical terms and directions, and continue as a student-driven course with those body systems in which the class is most interested. Circulation, respiration and the nervous systems are covered. Organ dissection is a required part of this course. The course culminates with a student-designed research project of the anatomy and physiology of a sport.

The students worked in groups of two to choose a sport that is offered at Independent High School and develop a website to serve as a training guide for Independent High School's student athletes for the final project of the class. Content requirements included important anatomy of the sport and how it functions (muscles, brain, cardio, skeletal, etc.), cutting-edge training and nutrition, physiology of improvement (what makes an athlete better), injuries related to the sport (avoidance and treatment), medication (legal and illegal), resources (external links, associations, etc.), and references (what and who the students cited, in MLA format). Additional requirements included an interview with an expert in the field and citing current research articles that informed the topic.

Groups used shared documents on *Google Docs* for research and planning and added their final results to pages on a website that the course instructor developed using *Google Sites* (which is *Google's* version of a wiki). In the course of my responsibilities at

the school, I worked with the instructor to design the project and introduce it to the class, guiding each group to create a shared document in *Google Docs* and suggesting useful sources to them such as appropriate library databases to use in the research. This placed me in the position of participant observer, though I did not offer any unsolicited help to students once they began working on the project and as I observed the students who volunteered to participate in the study, nor did I assess their work in any way. I refrained from suggesting ways to use *Google Docs* so as not to influence data generation. Groups were given several days during class to work together on the assignment, in addition to collaborating remotely from home using *Google Docs*.

Environmental Science: The Environmental Science course is an interdisciplinary, year-long elective course offered to juniors and seniors that examines the local and global environment from cultural, scientific, and historic perspectives. Students use knowledge from the life and physical sciences to make informed decisions about environmental issues. Research topics include human impact on the environment, resources, energy, pollution, and sustainability. Students are expected to complete research in lab and summarize findings in several formal lab reports throughout the year. Students design, build, and test wind turbines and solar cells in an effort to discover the impact that these technologies may have on future energy resources. Students may have opportunities to work side by side with members of the Austin community that work to keep the city green, sustainable, and looking toward the future.

As the final project for the course, students chose an environmental issue of relevance to the Independent High School community and developed a public service announcement (PSA) video targeted to students to build awareness and offer potential solutions. The requirements of the final product included a public service announcement video of no more than two minutes, many of the elements that are typical of a PSA (brainstormed by the class) such as using a catchy slogan, a famous face, humor/serious/heartstrings, a jingle or royalty-free music, and animation or live action. Groups also had to identify an issue important to the School community, propose a solution for the issue, tell why it matters to the community, and upload it to *YouTube*. The completed PSAs were shown to the student body over a period of two days during the announcements portion of daily chapel.

In groups of three, students used *Google Docs* for planning, notes, and script writing. They had at least six class days to create the PSAs, in addition to collaborating remotely from home. Again, in the course of my responsibilities at the school, I worked with the instructor to design the project and introduce it to the class, guiding each group to create a shared document in *Google Docs* and suggesting useful sources to them such as appropriate library databases to use in the research. This placed me in the position of participant observer; I did not offer any unsolicited help to students once they began working on the project and as I observed the students who volunteered to participate in the study, nor did I assess their work in any way. I refrained from suggesting ways to use *Google Docs* so as not to influence data generation.

English 12: In 2012-13, one section of English 12 was taught as a pilot class led by co-instructors. As English 12 is a required course, seniors were placed randomly in this section. It differed from the other sections for English 12 by the selection of required texts and its focus on trimester-long themes. In each trimester, the primary focus was on reading and writing closely and critically.

Students would engage in a significant amount of writing, in many different forms, and encounter critical analysis, argumentative essays, personal writing, free writing, and creative writing on a regular basis. Students were asked to write about things they have not written about before (a film, for example, or a photograph). They also used writing as a way of taking the content of this class with them when they leave the classroom, documenting and responding to the world around them in the form of a blog.

The writing assignments and responses for the blog varied depending on the text students were reading. The teachers used it to extend class discussion if they ran out of time. I did not participate in the development of these assignments, nor did I observe students working on them. I interviewed the instructor and students, examined course-related blog postings, and the course curriculum map.

History 9: The required ninth grade History course covers the civilizations of Mesopotamia, Egypt, India, China, Greece, Rome, Europe, and Africa and focuses on the literature, social history, intellectual history, and geography of the ancient world up to the Age of Discovery. Religion and ethics provide a foundation for the course and considerable attention is given to major religions like Hinduism, Buddhism, Judaism,

Christianity, and Islam. In the course, students will hone their critical thinking, writing and reading skills. Research and data analysis were emphasized. Much of the course is based on analysis of primary source documents. The course is designed to collaborate with English 9 as a part of the combined Humanities curriculum.

The project examined in the study required that students, working in pairs, write four 400-word journal entries that incorporated authentic details and historical information about events from primary and other documents. Each pair was assigned a teacher-written scenario (See Appendix E). All accounts had to be accurate, logical, and authentic based on the historical event and time period. Attention to historical detail, focus on context, agriculture, battles, weapons, technology, economy, culture dependent on each scenario. Each group had to use a shared document on *Google Docs* to record its research and write the diary entries. In the course of my responsibilities at the school, I worked with the three History 9 teachers to design the project and introduce it to the classes, guiding each group to create a shared document in *Google Docs* and suggesting additional sources to them such as appropriate library databases to use in the research. This placed me in the position of participant observer; I did not offer any help to students once they began working on the project and as I observed the students who volunteered to participate in the study, nor did I assess their work in any way. Groups were given only one day during class to work together on the assignment, as they could collaborate from home using *Google Docs*.

Latin II: A required course for students taking Latin, Latin II students deepen their appreciation and understanding of the Latin language and its influence on modern languages and culture. Students expand their English vocabulary and ability to reason logically and analytically. They continue with the translation of Latin passages of increasing complexity. In addition to continuation of Latin vocabulary and grammar, the course includes the study of history, geography, mythology, literature, derivatives, and culture, all with an emphasis on the life and times of Julius Caesar. Students have the opportunity to read authentic Latin, translating portions of the writings of Julius Caesar detailing the dramatic events surrounding his rise to power and ultimate assassination.

For the final project in the Latin II class, each student was assigned the role of one or more Roman emperors and used *Twitter* as a platform for developing the emperor's personality and applying knowledge gained through research. In the first part of the project, students began researching his or her emperor's life and reign. The instructor allowed library databases and *Wikipedia*, but no *Google* searches unless students filled out a Website Evaluation Form. He required fours sources including one book. In the second phase of the project students posted their research results to *Twitter*, posting a minimum of 50 tweets (individual postings to *Twitter*, each no more than 140 characters). Each tweet had to reflect an important date or event and effectively condense information from the student's research notes. The student's *Twitter* feed/s would ultimately need to reflect all the major events during the reign of the emperor and his life, as well as show a distinct personality for the emperor(s). The instructor gave extra credit if students created

additional *Twitter* accounts (for spouses, pets, or other creative outlets derived by students) and using images. In the third phase of the project, each student made eight additional tweets reflecting on the life or reign of another emperor with at least three tweets directed to the closest emperor chronologically succeeding and preceding one of the student's emperors. Additionally, the tweets must have compared or contrasted an event in another emperor's life or reign with the student's emperor, or succinctly reflect on another emperor's success or failure with substantive evidence from that emperor's *Twitter* feed. I did not participate in the development of these assignments, but I observed students working on them for one day in class. I interviewed the instructor and students and examined student's *Twitter* postings, the assignments, and students' research notes.

Interviews

Intensive interviews with participants started with a semi-structured approach to guide me in addressing the research questions and to gather similar material from all participants (see Table 3.3 and Table 3.4). Students and teachers knew me, so there was little need to "break the ice." The interview guide served to explore a topic and, by thinking through how to word open-ended interview questions, helped a novice researcher such as myself to "avoid blurting out loaded questions and to avert forcing responses into narrow categories" (Charmaz, 2006, p. 18).

Intensive interviewing allowed me to explore the topic and the participants' experiences in-depth and moved from semi-structured questions into those that requested clarifying details to obtain accurate representation of a participant's experiences and

reflections. It also let the participant follow topics that naturally arose in the conversation. In order to construct meaning from the participant's experiences, I questioned participant's definitions of terms, situations, and events as they arose in the interviews and tapped their "assumptions, implicit meanings, and tacit rules" (Charmaz, 2006, p. 32). I also occasionally shifted the conversations to "follow hunches" such asking a student to explain more about why her mother did not want her to use social media (Charmaz, 2006, p. 26). Questions for subsequent interviews emerged from the data and allowed me to follow up on leads, adding rich description to existing data, fill in gaps in the data, and to triangulate prior observations and document analysis.

Charmaz (2006) suggests a variety of question starters for crafting initial open-ended, intermediate, and ending questions (pp. 30-31) to obtain rich material while simultaneously "avoid[ing] imposing preconceived concepts on it" (p. 33). These questions reflect a "symbolic interactionist emphasis on learning about participants, views, experienced events, and actions" and are intended to study individual experience (p. 33). After initial conversation with each participant to explain the significance of the study, I asked a series of initial open-ended questions that allowed unanticipated material to emerge and followed with intermediate questions that probed for clarifying explanations and allowed me to go back to an earlier topic to gain more information. I finished with questions that asked the participant to tell about their views, give advice to teachers just getting started using new media, and elicit any other information that the

participant feels would be important that wasn't previously covered (Charmaz, 2006, pp. 30-31).

Initial semi-structured interview questions for students:
What is your understanding of new media? [Explanation and examples will be given if student does not understand the term.] What new media do you use? Why do you use [list specific media]?
What new media do your teacher have you use in assignments? Can you give me examples? Why do you think your teacher chose that new media tool?
Can you explain an assignment in which you used [name a particular new media tool]?
What do you think you were supposed to learn by [a particular] assignment?
Does the use of new media in your assignments help you learn? If a positive response is given: Can you explain more about that? How does it support your learning? What are you learning? What are you learning that you can use again? If a negative response is given: Why do you think the tool does not help you learn? What should you (or the teacher) do differently so that learning occurs?
Could you learn the same subject matter without the use of new media? Could you learn [list the transferable skills from the question above] without the use of new media tools?
Describe the process you use when your teacher gives an assignment that requires you to find information in sources other than your textbook.
Describe the process that occurs when you are working in a group. What makes group work beneficial? What are the drawbacks? Why does your teacher want the class to work in groups? Can you explain further?
What do you like about using new media in the learning process?
What don't you like or would change about using new media in the learning process?
What advice would you give teachers who are just getting started with having students use new media in their classes?
What else do you want to tell me about using new media in the learning process?

Table 3.3: Initial semi-structured interview questions for students

Initial semi-structured interview questions for teachers:
What is your understanding of new media?
What new media do you use in the curriculum? Can you give examples of how students use it?
Why do you use new media for particular assignments?
What exactly do you want students to gain by using [list new media from question above] for [a particular] assignment?
How does new media contribute to knowledge building in your subject area? Could students learn the same content without the use of new media?
What skills do students develop as they use the new media to satisfy the requirements of your assignment?
How do you assess the learning process and product when using new media for assignment support? How does assessment differ when you are grading student results from assignments using new media and those that do not?
What privacy protections do you put in place for student use of new media?
Do your students all have high-speed internet access at home if they need to work on an assignment for homework? What provisions does the school have in place if they don't?
What are the obstacles to using new media in the learning process?
What are the benefits to using new media in the learning process?
What advice would you give a teacher who is thinking about using new media to support student learning?

Table 3.4: Initial semi-structured interview questions for teachers

Each student interview took place in my office in the school's library and lasted from 30-40 minutes. I conducted teacher interviews in their offices so that they were comfortable in their own setting and could continue to work after we finished. These interviews lasted for 40-45 minutes.

Coding

Coding is the process of defining what the data are about by categorizing segments of data with a short name that both summarizes and accounts for each piece of

data and is the initial step that "moves beyond concrete statements in the data to making analytic interpretations" (Charmaz, 2006, p. 43). Coding requires the researcher to put aside preconceived notions about what he or she expects to find in the data in favor of letting the data and its interpretation guide the analysis (Corbin & Strauss, 2008, p. 160). Charmaz (2006) posits that grounded theory coding "generates the bones" of the analysis and that "theoretical integration will assemble these bones into a working skeleton," shaping the analytical frame for building the analysis (p. 45). An iterative process consists of initial and focused coding, writing extensive memos, and engaging in theoretical sampling resulting in developing conceptual categories.

I made notes of key points during the first 15 interviews using a *LiveScribe* smart pen and compatible dot paper notebook, which records the audio portion of an interview and syncs it to the written notes (http://www.livescribe.com), as well as using a backup voice recorder. The pen's display stopped working about midway through so I abandoned this effort and relied exclusively on the voice recorder. Each interview was transcribed after completion and upload into *Atlas.ti*, a qualitative data analysis program (http://www.atlasti.com). I used the interviews as the primary data to begin initial coding.

Initial coding

Coding begins as soon as the first data are collected (Corbin & Strauss, 2008, p. 163). Through initial coding, the researcher remains open to exploring whatever theoretical possibilities can be discovered in the data. Initial coding sticks closely to the data, requiring the researcher to "see actions in each segment instead of trying to impose

preexisting categories to the data" and generating "thinking and allowing new ideas to emerge" (Charmaz, 2006, p. 47-48). Initial codes are "provisional, comparative, and grounded in the data" and prompt the researcher to see areas that lack needed data and seek sources of needed data and collect them (p. 48). When coding the first two or three interview transcripts, I found myself trying to compartmentalize codes into preconceived theoretical categories such as "communication," "collaboration," and "creativity" instead of keeping the codes organic and grounded in the language of the document, so I re-coded the transcripts and concentrated on keeping the subsequent codes grounded in the data. Charmaz (2006) suggests that careful initial coding helps fulfill two criteria of grounded theory analysis: fit and relevance. The study "fits the empirical world when you have constructed codes and developed them into categories that crystallize participants' experience . . . [and] [i]t has relevance when you offer an incisive analytic framework that interprets what is happening and makes relationships between implicit processes and structures visible" (p. 54). Careful coding also helps the researcher think about the data in new ways that may differ from research participants' understandings (p. 54).

Forty interviews yielded more than 400 codes, from an *in vivo* code "a really good study tool" to "*YouTube*," an online video hosting service where students uploaded Environmental Science public service announcements. During initial coding I tried to ask the questions suggested by Charmaz (2006): While coding initially, the researcher asks:

- What is this data a study of?
- What does the data suggest? Pronounce?
- From whose point of view?
- What theoretical category does this specific datum indicate? (p. 47).

I used “natural breaks” as “cutting off points” when coding as suggested by Corbin & Strauss (2008), as this felt more natural to me than the word-by-word or line-by-line that Charmaz (2006) suggests for initial coding of interviews. But I did use word-by-word and line-by-line as it fit the particular code.

As an example of initial coding, note those that I assigned to Arianne, a student who was enrolled in three of the studied classes, (although when I scheduled the initial interview, I believed her to be enrolled in only the Anatomy and Physiology class). Her enrollment in other classes came out early in the interview. A paragraph from Arianne’s interview:

> I think sometimes it is easier to learn, just because it’s a different way of learning. I’m more of a hands-on [learner]. I’d like to create a poster or actually paint a picture or something like that. But sometimes it’s nice to have different ways to learn which is what I think they’re trying to do. It’s nice especially with the *Tumblr* [blog] we do for English because you can see everyone else’s posts and it’s cool to read those and for them to contradict your ideas. That way, it’s not as if you’re reading someone’s paper that they have to print out and hand to you and discuss. You can just read it online in your free time and see how it contradicts your own thoughts.

Quote: easier to learn
Code: (*in vivo*) easier to learn

Quote: a different way of learning
Code: (*in vivo*) a different way of learning

Quote: hands-on
Code: hands-on learner

Quote: have different ways to learn which is what I think they're trying to do
Code: different way of learning

Quote: *Tumblr*
Code: *Tumblr*

Quote: see everyone else's posts
Codes: see other's posts, learning from classmates

Quote: it's not as if you're reading someone's paper that they have to print out and hand to you and discuss
Code: don't have to print to discuss

Quote: read it online in your free time and see how it contradicts your own thoughts
Codes: work remotely, learn from classmates

See Illustration 3.1 for an example of initial coding of interviews.

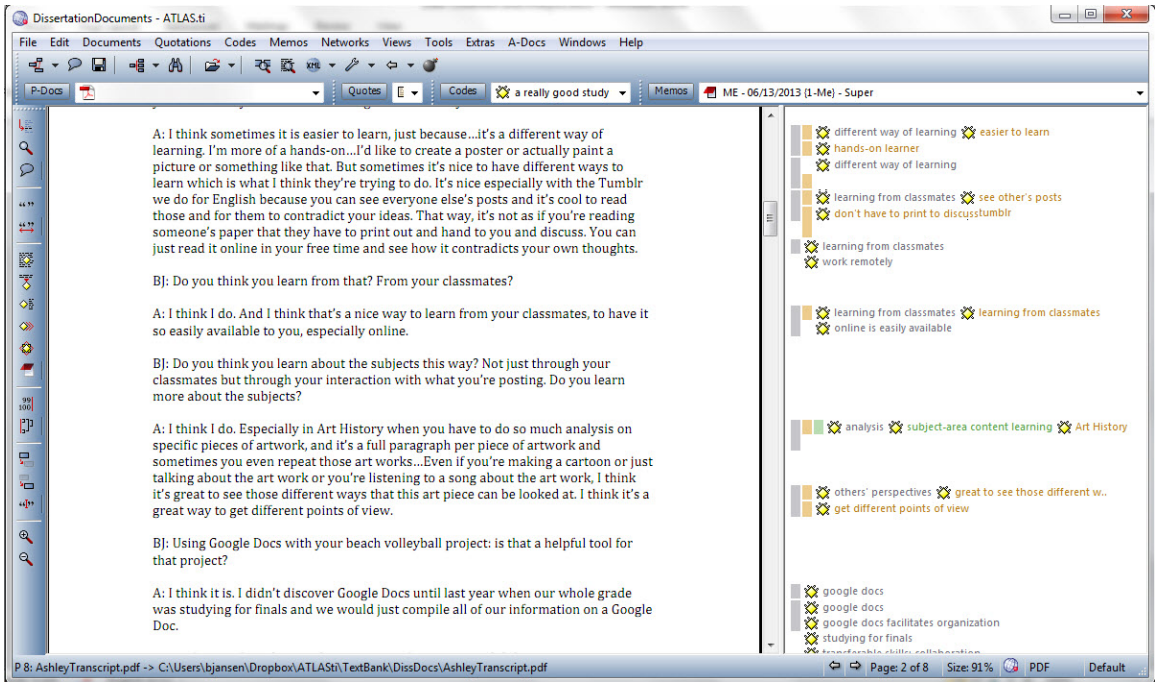


Illustration 3.1: Example of initial coding as recorded in Atlas.ti

Some chunks of text offered more than one idea for a code so I assigned multiple codes. Some of the multiple coding worked well for later analysis, such as "see other's posts, learning from classmates" as coded in the paragraph above, but many of these multiple code decisions should have been separated from the beginning, such as "work remotely," and "learn from classmates" as coded above.

I used constant comparative methods (Charmaz, 2006, p. 54; Corbin & Strauss, 2008, p. 73; Glaser & Strauss, 1967, p. 105) when initially coding units of data, as well as in focused coding and category and concept development, in order to establish analytic differences and therefore make comparisons at each level (Charmaz, 2006, p. 54). I used

a variety of ways to compare data with other data to find similarities and differences such as comparing interview statements and incidents within the same interview and in different interviews and comparing data in earlier and later interviews of the same individuals (p. 54). The constant comparative method informed further initial coding by allowing me to revise codes in the first interviews as I compared them to subsequent ones. For instance, students involved in the Latin II Roman emperor *Twitter* project talked about "slim[ming] down" or "you have to figure out how to say all these things that mean so much in so few words." The instructor for the course called it "information processing," so I revised the codes to reflect that terminology. See Appendix F for a list of initial codes.

During initial coding, I began to write memos about the relationships among the data and to record emerging focused codes and possible categories, such as "transferable skills," "locating information," and "teacher use." I used *Evernote* (an online note taking and organizational service) for memo writing, as it has a tagging feature for later searching. I assigned tags (keywords) for each memo that began to show a pattern for creating categories.

Focused coding

The second major step in coding, focused coding, is more directed, selective, and conceptual than initial coding methods (Charmaz, 2006, p. 57). Focused coding means "using the most significant and/or frequent earlier codes to sift through large amounts of data . . . and [it] requires decisions about which initial codes make the most analytic sense

to categorize your data incisively and completely" (p. 57). Again, I used the constant comparative method to compare data and initial codes with each other. Comparing data to data resulted in the first group of focused codes that I created in *Atlas.ti*. I labeled related codes by inserting extant terminologies, such as "transferable skills" and "*Tumblr*," in front of the initial code. (See Illustration 3.2). I removed codes that did not seem to inform the study. Grounded theory literature calls for researchers to avoid forcing their data into preconceived codes and categories that derive from extant theories and the researcher's own views and experiences with the studied phenomena. "[E]ach preconceived idea should *earn* [italics in original] its way into your analysis—including your own ideas from previous studies" (Charmaz, 2006, p. 68). The extant code names "transferable skills" and the names of the new media, such as "*Tumblr*," help me to "understand what the data indicate." See Appendix G for a list of focused codes.

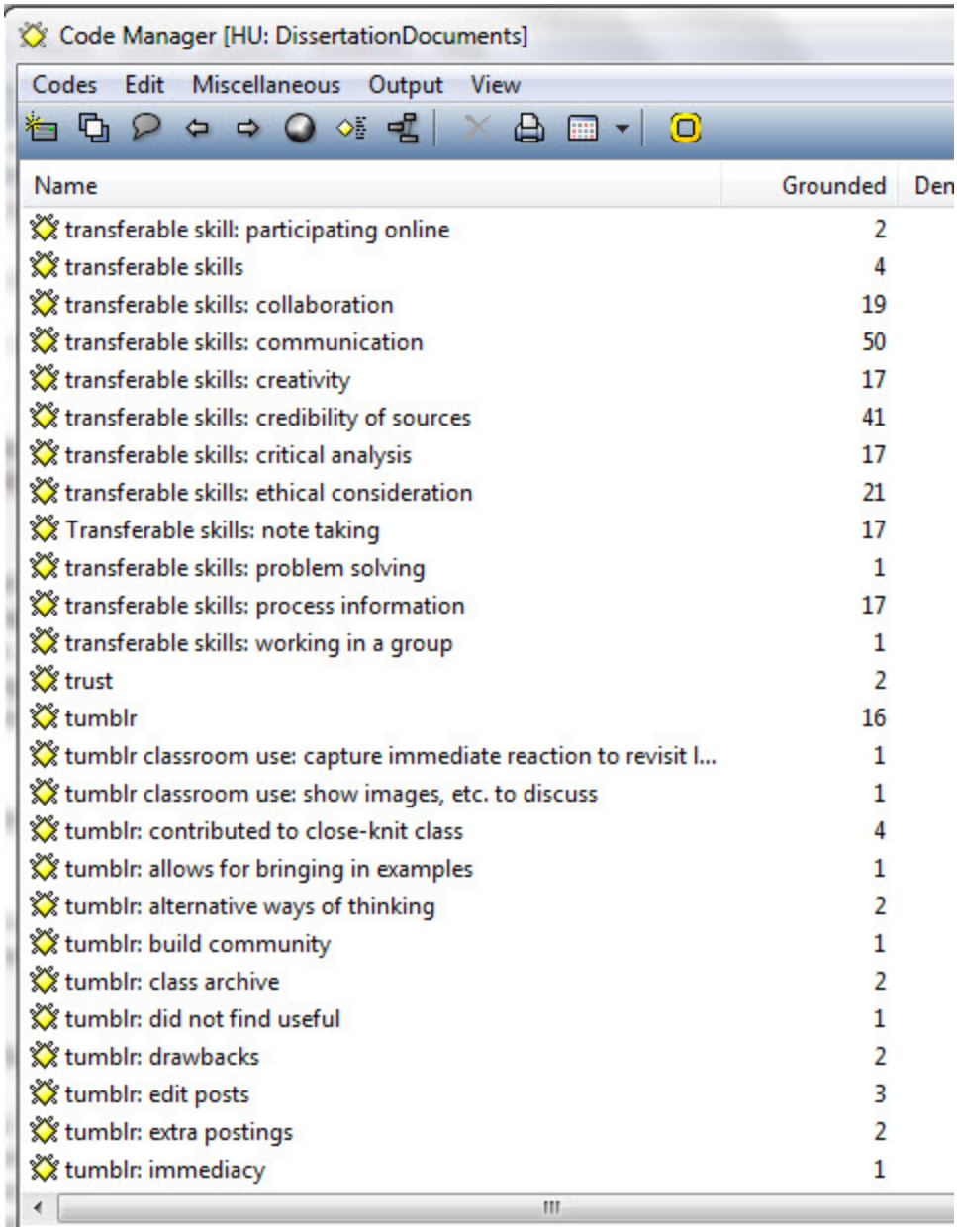


Illustration 3.2: Focused coding

I merged many codes within *Atlas.ti* such as “using databases to find sources for history paper” with “locating sources: use databases for big projects,” “tool critical to learning” with “blog features not replicated in journal,” “group work advantages” with

"bounce ideas off of another person," and "communication" with "chat." As I continued to study, merge, and write memos on the initial and preliminary focused codes, I began to see definite focused codes emerge.

I used the "Family" feature in *Atlas.ti*, which helps manage large amounts of objects by classifying them into subsets, to create an initial fifteen focused codes. Figure 3.2 shows the Families (categories of focused codes) in relation to the number of initial codes and quotes each subsumes. See Illustration 3.3 for an example of one family with its subsumed initial codes. See Appendix H for a complete list of Families (focused codes) with their subsumed initial and preliminary focused codes.

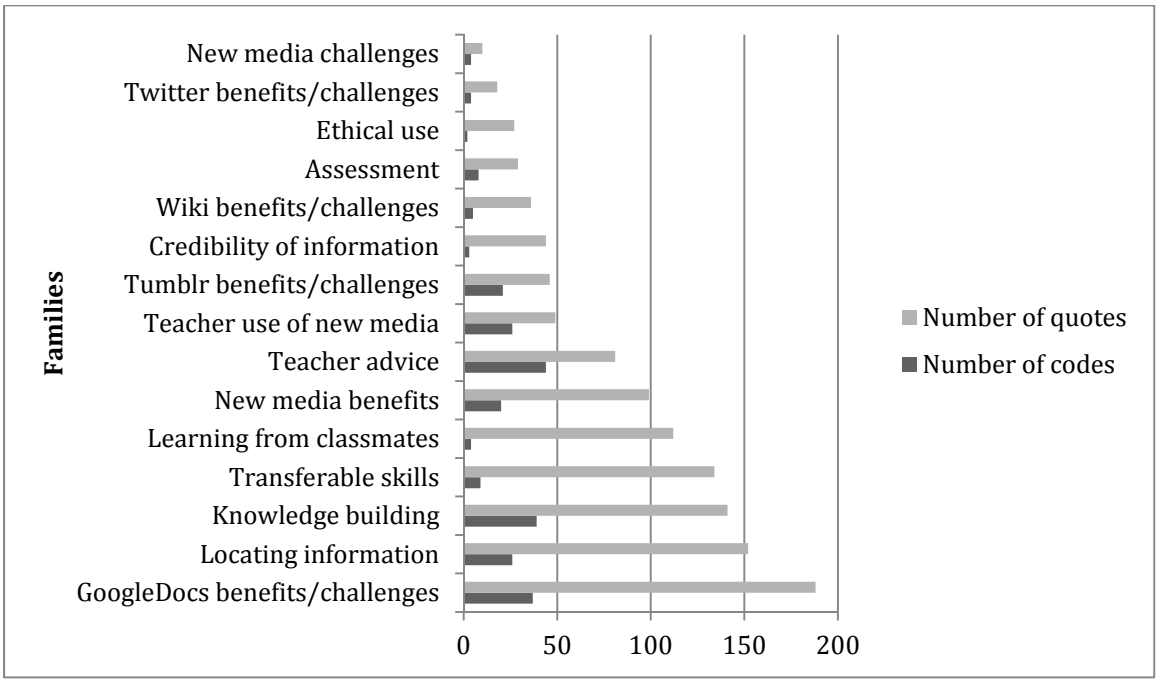


Figure 3.2: Families (focused codes) in relation to the number of initial codes and quotes each subsumes

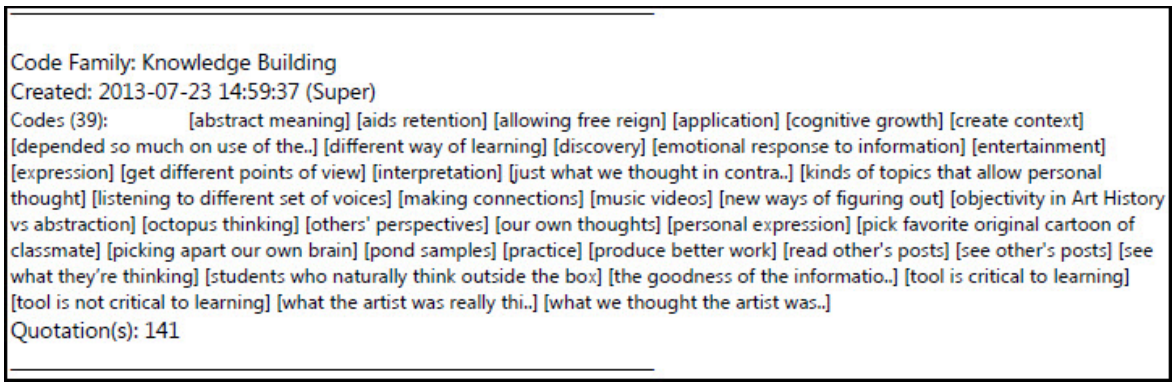


Illustration 3.3: Example of one family (focused code) with subsumed initial and focused codes

Memo Writing and Category Development

Upon creating the focused codes from the initial and preliminary focused codes, I began memo writing in earnest in order to define theoretical categories and begin to raise categories to concepts. Starting by developing focused codes, memos give the researcher a space for "making comparisons between data and data, data and codes, codes of data and other codes, codes and category, and category and concept, and for making conjectures about these comparisons" (Charmaz, 2006, p. 73). Writing memos is the essential step between data collection and draft writing and is a crucial method in grounded theory because it "prompts you to analyze your data and codes early in the research process" (Charmaz, 2006, p. 72). Memo writing delivers a space to become actively engaged in the materials as the researcher constructs analytic notes to clarify and fill out categories.

A theoretical code is the next level of coding and takes a more sophisticated approach. These codes specify possible relationships between categories developed during focused coding and are integrative, "lending form to the focused codes" that the researcher has collected (Charmaz, 2006, p. 63). These codes "not only conceptualize how your substantive codes are related, but move your analytic story in a theoretical direction (p. 63). Birks and Mills (2011) describe theoretical codes as "advanced abstractions that provide a framework for enhancing the explanatory power of . . . [the study's] storyline and its potential as theory" (p. 123). Glaser & Strauss (1967) describe two kinds of categories that emerge from theoretical coding: those that the researcher has constructed and those that have been "abstracted from the language of the research situation" (p. 107).

I printed out each focused code family constructed in *Atlas.ti* (see Appendix H) along with subsumed initial and preliminary codes and quotes in order to begin looking for relationships between categories, and check my placement of quotes and initial codes into the focused codes. Hand-writing notes in the margins, I examined each focused code by reading it and the accompanying quotes, deciding whether it earned its way into that focused code, should be assigned to another one, or should be removed from this study altogether, as it did not inform the research question. I removed the following focused codes: assessment, credibility of information, locating information, and teacher advice.

I continued to move many useable quotes from one focused code to another. For example, I moved ". . . someone else puts their two cents in, it's nice to see what they

have to think and come from a different angle . . .” from the “Learn from classmates” code to the “Knowledge building” code. After reading the quotes, thirteen initial codes were moved from Teacher Use of New Media to Knowledge Building. I also used this exercise to choose those quotes or portions of quotes that might help describe the properties of a category either by their unique wording to help define a category, how they are representative of other students’ or teachers’ perceptions, or by the way they might define the variances in the properties of the category.

I added many side notes and new codes as I began to see additional patterns emerge that might define additional categories or begin to raise categories to concepts. For instance, I noted that when talking about the class wiki for AP Art History, students often commented on the convenience of having assignments and other class materials available and always accessible in one place, and made the note of “permanent repository” by each quote. Other students commented on the same benefit of using *Google Docs* for planning and taking notes for a group project, also a “permanent repository.” I created memos for each focused code in *Evernote,* and as I examined each print out of the focused codes, I added the useful quotes, new codes, and ideas to each category’s memo. I also added new memos for those categories that did not emerge during initial and focused coding, such as “octopus thinking” and “face to face.” Once I had examined the print outs of focused codes, I began to develop Knowledge Building, a major concept in the research question.

I had the preconceived notion that students would offer evidence in their interviews of gaining explicit content-area knowledge. As I examined the focused code Knowledge Building and its initial codes and supporting quotes, I began to write about how each specific tool contributed to knowledge building of the explicit kind. My initial memo began, “Do tools help build knowledge? I can’t really make a distinction at this point between knowledge building and new media’s support to build (or not) knowledge. Let me see where this runs...” As I added supporting quotes for each tool, I revised what types of “knowledge” students were gaining from their interactions with content and classmates’ through new media. (See Appendix I for the progression of memos writing for knowledge building.) Ultimately, I revised my approach, having determined that the new media tool may not actually help build content, but it facilitate the process needed to build knowledge. Further memo writing developed knowledge building activities in eleven broad categories:

1. Make connections
2. Place in (build) context
3. Raise level of concern (motivation) resulting in producing better work
4. Promote/foster participation (closely tied with motivation to do well for peers above). Facilitates participation for quiet/uncertain students
5. Learn from others, connectivism: (octopus thinking, jumpstart own thought process by reading what classmates have posted in order to get started on an assignment or clearing away uncertainty during thought process during the

assignment by looking at another perspective, learning material from each other by looking at different perspective)

6. Application
7. Recall
8. Information processing
9. Fact building (limited)
10. Self (creative) expression
11. Distributed cognition (the ability to interact meaningfully with tools that expand mental capacities)

With further examination of the categories and writing memos, concepts began to emerge along with two kinds of knowledge that new media tools promote or support: 1) subject-area content acquisition (applications), making connections, application of knowledge (explicit knowledge?), and 2) broadening perspectives and learning from others such as good habits, others perspectives/opinions, people skills (is this tacit knowledge and do the tools support tacit knowledge building more than they do the explicit variety?).

I revised the code family "Transferable Skills" by generating memos for the individual skills (Collaboration, Communication, Creativity, Critical Thinking, and Process Information), as these were defined in the 21st century skills sensitizing concepts and had the qualifications of theoretical categories. I changed Process Information to Use of Information, a better description of the variety of actions students applied to

information. I merged Working in a Group with Collaboration. The focused codes detailing the Benefits & Challenges of new media tools examined in the study, as well as Learning from Classmates, had already been subsumed into the categories under Knowledge Building. The Knowledge Building memo had become unwieldy, so I separated it into eleven separate memos based on the categories above. Again, using the constant comparative method, I made comparisons between data and data, data and codes, codes of data and other codes, codes and categories, and made changes as needed. Theoretical concepts began to emerge from the data.

Concept Development

Ultimately, memo writing functions as a vehicle for the researcher to raise focused codes and theoretical categories into conceptual categories in order to explicate ideas, events, or processes in the data and form the core of the grounded theory. Categories should be as "conceptual as possible—with abstract power, general reach, analytic direction, and precise wording" (Charmaz, 2006, p. 91). Merriam (2009) suggests that categories should be:

- Responsive to the purpose of the research—categories are the answers to your research questions
- Exhaustive—you should be able to place all data that you decided were important or relevant to the study in a category or subcategory
- Mutually exclusive—data should fit into only one category

- Sensitizing—the naming of the category should be as sensitive as possible to what is in the data
- Conceptually congruent—the same level of abstraction should characterize all categories at the same level. (p. 185-186)

As I began to write the first draft of the findings, I saw that some of the properties of the theoretical categories that supported knowledge building did not fit into the assigned category. I played with the data, moving whole categories into other categories or new categories, and properties from one category into another. Learning from Others evolved into a new category, Broadening Perspective. I merged Make Connections, Fact/Content Building, and Recall Facts into Broadening Perspective. Application moved to Critical Thinking. I combined Build Context and Information Processing with Use of Information. Raise Level of Concern moved to Promote Participation. Self (Creative) Expression merged with Creativity. Most of the properties included in Distributive Cognition moved to Collaboration, with a few merging with Broadening Perspective.

Seven conceptual categories rose from focused and theoretical codes and memo writing: increasing participation, broadening perspective, using information, thinking critically, exercising creativity, collaborating with others, and communicating efficiently and effectively. Charmaz (2006) suggests using gerunds in coding and memo writing as it "fosters theoretical sensitivity because the words nudge us out of static topics and into enacted processes" and prompts "thinking about actions" (p. 136). The properties of each

conceptual category will be explicated in chapter four and will include supporting evidence from transcripts, field observations, and related documents.

Chapter Four: Presenting the Findings

Conceptual Categories

By raising codes to conceptual categories, narrative statements memos define the category, explicate the properties of the category, specify the conditions under which the category arose and was maintained, and show how it relates to other conceptual categories (Charmaz, 2006, p. 92). Seven conceptual categories rose from theoretical codes and memo writing: increasing participation, broadening perspective, using information, thinking critically, exercising creativity, collaborating with others, and communicating efficiently and effectively. The properties and dimensions (range of variance) of each conceptual category are explicated below. So too are the conditions, as appropriate, under which the category arises and is maintained. I changed the personal names of participants to ones that are fictitious and bear no bear no resemblance to the actual names of students and teachers who participated in the study. The use of images in this study falls within the fair use provision of the Copyright Act, Section 107. The purposes for which the images were used and the uses themselves are transformative, and the students whose examples I included and I have used no more than is appropriate to achieve our transformative purposes.

Increasing Participation

Teachers and students suggested that new media encouraged students to participate in ways not supported by traditional class discussion and assignments that are assessed only by the teacher. Teachers discussed the benefits of being able to “see the

thinking" of all students in their classrooms and students commented on how being able to see how the opinions, explanations, ideas, and responses of all of their classmates broadened their own perspectives.

Seeing Thinking of All Students

New media offer a lens into the thinking and understandings of all students. It enables participation for all students, as not all students readily participate in oral discussion and limited class time may prevent each student from fully elucidating his or her own ideas.

Ms. Harper, English 12 teacher, discussed the notion of being able to "see what [students] are thinking":

> I felt like the *Tumblr* [class blog] was a class discussion where everybody's talking and saying really cool things and being a little bit personal, being really thoughtful, and for a good long while, however long it takes to write a good blog post, 20-30 minutes. . . . It's that thinking that we can't make sure is happening if they're sitting in class. They look like they're thinking, but they're quiet and we don't know what they're thinking. But with the blog posts, they're not being quiet and we see what they're thinking. That's why I'm a fan. There it is online [and] it's a great discussion. And again, they're not all talking in response to one another, but they're still talking in response to a communal question. And that's what a discussion is too, it's just [that] everybody gets to speak. That cannot be reproduced in a class discussion. . . . [T]he blog was all about thinking and a place

> to think aloud [and] write out all of your thoughts without feeling like you have to be composed and write in this academic manner. There was tons of writing that wasn't super academic but it was really smart and really thoughtful and that's why we kept doing it.

Increasing Participation of Reluctant Students

Students may not readily enter into class discussion for several reasons. Ms. Harper discusses the reluctance of some students:

> . . . there are some kids, especially by the time they are 17 or 18, by the time they've been in school for that long, they are so hardened in their routines and in their ways that you cannot get them to say more than "yes" or "no," or a sentence in answer to a discussion question. So there are going to be some kids who are not participating in the way that you'd like them to. But in the blog posts, everybody's participating and they're talking, they're thinking.

Ms. Parker agrees:

> If you're not someone who likes to talk in front of the class, you have this whole other space where you get to participate in a discussion of what's going on. It brings in a different kind of participation, and it opens up a doorway for a different sort of student to take the lead, and that's really important.

She added that it has allowed students who were not always the strongest leaders in class discussion to be the leaders in the online discussion, which meant that "people were listening to a different set of voices than they are when they are in class discussion

every day." Kendra also recognizes the benefit of encouraging participation. "Some people are timid or shy to talk in a group discussion and maybe it's easier to type their ideas and get everything out there. I think that without [the] *Tumblr* [blog], you lose a lot of people's ideas."

Ms. Parker offered another explanation of why students may hesitate to speak up in class, but will articulate their thoughts on the blog:

> I think a lot of times in the English classroom you get this sense of, "OK, my teacher is looking for a particular kind of answer, I'd better think of that answer, and if I can't think of that answer I'd better not say anything." We were hoping that this would feel more open, that students would feel like, "I can say whatever I want here. And I don't have to worry too much about grammar, or I don't have to worry too much about answering the question [the way I think the teacher wants it], I just have to find something that interests me and write about it."

Ms. Roberts confirms the notion that new media support participation, suggesting that by having students respond on the AP Art History wiki encouraged students "who have a difficult time with oral expression to be able to be very confident and forthcoming on this because they've got time to think about it, they can polish it before they put it in front of anybody's ears or eyes."

An effective use of new media suggest that it can provide an alternative method of communication for students who have social challenges that may prevent them from participating in whole group, or even small group, discussions. Observation in two

classes (History 9 and Latin II) showed that one student, Heath, rarely interacted with his classmates or contributed to class discussion. Mr. Mann, Heath's Latin II teacher, assesses the situation this way:

> He has full on Asperger's. He doesn't communicate well with his peers in a learning context, he doesn't function collaboratively in a classroom, and he had some of the best tweets [postings on *Twitter*] out of everyone. They were hilarious and they were interesting, and you could tell that he understood what was going on in a way that when I'm just standing in front of a classroom teaching, I have no way to really know if he is paying attention or not, just because of his affect and his demeanor. I mean, he's listening, but the way he learns is not apparent.

Mr. Mann observed that students began to emulate Heath as the pioneer of creative ways to apply factual information in tweets.

> He started doing it this way and I saw other students do it similarly, and that's not something he would get anywhere else. I purposefully gave him emperors that had shorter reigns so that it wasn't such a huge, overwhelming amount of information. And so, he had less information to parse through, but had more people to deal with and I was really impressed with, from the get go, he developed personalities for his emperors like that. It was funny and quirky and it's not something that, for a student with his kind of learning difference . . . he can do in any other way. In that way, the medium of *Twitter* gave him a liberty that he would not have had anywhere else. The other thing that I thought was really neat

about this was that a student with pretty extreme learning differences, functioned on a completely different level on this project than any other work that he's done in the class.

Heath substantiated Mr. Mann's assessment:

> It's when I'm face to face and I'm trying to get somebody to feel a certain way in particular, that's what's hard for me. *Twitter* is kind of different because I am not trying to carry on a conversation. I mean, [in this interview], you ask me a question and I answer. That's kind of easy for me because I'm not trying to carry on a conversation. It's the same thing about *Twitter*. I say something and [the other emperors] can say something totally unrelated and it would be okay.

Increasing Participation By Motivating Students to Produce Better Work

Having a wider audience other than his or her teacher raises a student's level of concern and results in students producing better work. Rylie states that she believes that she does better work when posting on the English 12 *Tumblr* blog because her level of concern is raised if her classmates will see her work, plus she is more motivated to get it done and not procrastinate because everyone will know if she does a poor job.

> So you're not really able to procrastinate and you have to put it out there and you know it's going to be read by your classmates and not just your teacher. So if you're like, "I'm just going to write something crappy, and it's fine because I don't care about my teacher," but, you don't want your classmates to realize you're a moron. So, basically, you're forced to do well on it.

Ms. Roberts substantiates this assertion: “Having to post for their peers to see on the class wiki pages, raised their level of concern to do better work—they do not want to look foolish in front of their friends.” Iris seems not as concerned about what her classmates think of her, but in how her work may affect a classmate. She talks about making her notes better when she is working on *Google Docs* with another person because “my notes can sometimes be confusing, so I make them better where another person can understand them.”

Extending the Classroom

Teachers expressed the benefits of using new media remotely as an extension of the classroom, which increased participation of all students. Ms. Parker and Ms. Harper used the *Tumblr* blog as “a space for a conversation that we didn’t have time for in class.” Ms. Harper added that the “biggest thing [they got of using the *Tumblr* blog] was probably the sense that their English class discussion didn’t end when they left the classroom,” giving students time to think and refine their written contributions, and more time to make connections with the course content by bringing in links to outside examples. Ms. Tobler believes that her students could not have done [the PSA project] as effectively unless they were sitting down together in a face-to-face setting, as *Google Docs* allowed them to work remotely. Mr. Fletcher noted that due to time constraints in getting through the unit he could not afford to allow students to work on the project during class. *Google Docs* allowed students to work together but in separate locations to complete the History 9 project.

Teachers agree that the new media they use extends class time, allowing for more thoughtful and meaningful assignments. Ms. Roberts notes that she wanted engage her students in more activities that allowed for thoughtful participation and more creative thinking, but that

> there wasn't enough time within the bell to bell classroom to be able to integrate those things in a meaningful way. The wiki allows for them to exercise creativity in a way that there's not time in our classroom to do. The nice thing about the wiki is that it is outside the classroom.

Kim confirms, adding that she thinks Art History is more lecture based than discussion based and that in order to add discussion, there would need to be a longer class period "[w]hich I think is what the wiki kind of does. It kind of prompts that discussion between students, since we don't have the opportunity to do it in class."

Table 4.1 summarizes the conceptual category of increasing participation and the dimension (range of variance) of each property.

Increasing participation	Property	Dimension
	By all students	provides more time for students to think, write and polish before putting thoughts out for others to consider
		allows all students and the teacher(s) to "see the thinking" of all students
		raises students' level of concern resulting in better work
	By students who may not participate in class discussion	student may think the teacher is looking for one correct answer that he or she does not have therefore student can see variety of answers offered by other students
		student may be skeptical or obstinate therefore student is required to respond to the online prompt
		student may be socially challenged (shyness or psychological diagnosis) therefore new media offer student an alternative platform for participating
	By extending class time	gave students time to bring in examples to make connections between the course content and students' lives
		gave students time to read classmates' contributions instead of only hearing the perspective of the teacher
		provided time to continue class discussion because the class did not end with the dismissal bell
		provide a space for class discussion when there is no time for it in a lecture-based class
		provided time to engage in more extended assignments in order to apply what the students learned in class and exercise creativity

Table 4.1: Concept of increasing participation and its properties and dimensions

BROADENING PERSPECTIVE

A common theme appearing in many of the interviews is the notion that students learn from outside sources and from each other, both of which are made possible by features of new media. Students suggested that new media features allow them to bring in outside sources that connect the course content with their own lives. They also propose

that by accessing their classmates' contributions in a central location and being able to "see" classmates' responses to curricular stimuli, their own perspective of subject area content it broadened. By making connections from outside sources and learning from their classmates, students increased their subject area knowledge.

Through responding to reading prompts and adding unsolicited blog posts and comments to a senior English class blog, students made connections with subject-area content and each other, used ideas and information, and extended conversations that would not have been possible in traditional class discussions. The English 12 curriculum calls for students to "make connections between themes of the material and real life issues. Prove a thesis using textual evidence and analysis. Reflect independently and creatively based on personal experience/beliefs" (Horne & Pinkston, 2013). Teacher Kate Harper explains the kind of thinking she and her co-teacher want students to exercise to facilitate making connections: "Octopus thinking is a way of branching out and thinking about a number of different issues at the same time and how they all connect. . . . [T]his is just a term that we came up with in the confines of our own class." Ms. Harper continues:

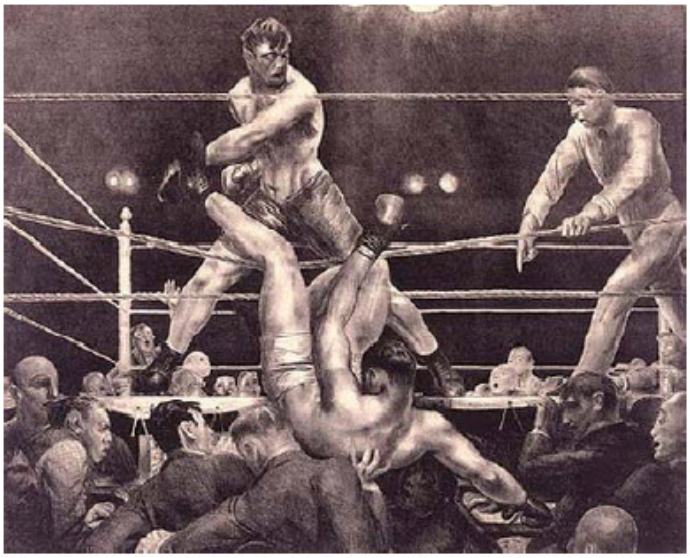
> We were hoping [the class blog] was a facilitator [for making connections between themes of the material and real life issues], I think, without necessarily expressing that. We were hoping that, in a way, [the blog] would make their minds more flexible and more open and that some surprising things might happen. Every time that happens, that kind of helps open their minds a little bit, any time

there's something surprising, that they see something new for the first time and they're like, "Oh!" Any time they see someone else, too, practicing octopus thinking or octopus writing [contributes to their own knowledge about a subject].

Illustration 4.1 and Illustration 4.2 show how students make connections using the blog.

Oct. 2, 2012 at 11:47am with 2 notes

George Bellows



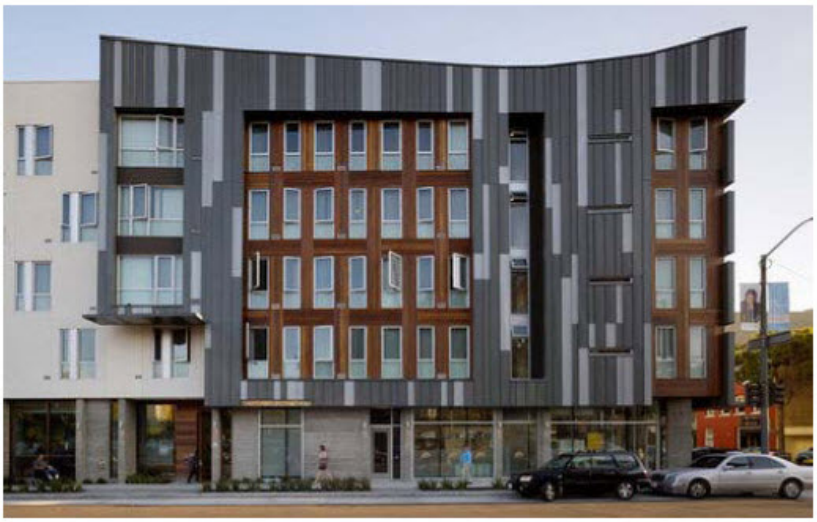
While reading My Antonia, my sympathies tended to lie more with Jim than any other characters. This is most likely because of all the characters, I think Jim is the most pathetic. Though his parents die, he can't even admit to himself that he misses them. When Mr. Shimerdas dies, he can only think about what he should have done for him, not what he should do for the living Shimerdas. As Jim slowly and predictably falls in love with Antonia, a girl so angelic and perfect in his eyes that even old and saggy she makes him feel that desperate, teenage-girl-esque pang of love, the reader can't help but feel bad for him. He can't even muster up the willpower to dislike her husband, a man he should hate, because that would require more time and effort than Jim can bear to concede to emotions and human feelings. All this pathetic-ness of Jim always reminded me of George Bellows's wrestlers. George Bellows was an American painter of the realist style who painted urban life in New York City. He was well known for his graphic but artistic portrayals of wrestlers, just like the one shown above (or below, I don't know how this tumblr thingy works.) As Jim is knocked down again and again by his own unwillingness to commit and his own insecurities about Antonia (marriage with Lena, Antonia's ring, etc) he seems just like the poor wrestlers who is wrenched into motion by the force of another person's swing.

[redacted], this is a fascinating connection. I love your last sentence in particular - Jim is definitely a person set into motion by the actions of everyone else.

[redacted] – I'm missing the George Bellows show at the National Gallery of Art by 4 days. It ended today. I'm heartbroken. I love the connection you make to MA.

Illustration 4.1: Student makes a connection between themes of literature and art, and including her teachers' comments

Oct. 14, 2012 at 3:52pm with 3 notes



I saw this story in the New York times on Tuesday (10/11), and it reminded me of the Eula Biss reading. An mixed-income housing development called Tassafaronga Village opened in Oakland, California two years ago. The neighborhood used to be "gritty" and "notoriously dangerous," but now "luxury apartments and fancy chocolate shops are moving in." This sounds like the gentrification that Eula Biss describes where "everything worthwhile about [an area] is destroyed" except that is not the case here: Tassafaronga is a subsidized housing project built on a $54 million budget, but it is not meant as a chic pricing out. The Oakland police report a 25% drop in crime since 2007 in the neighborhood. Across the bay a new development for formerly homeless persons has opened.

This is proof that the stuff we read about in school is for real.

Illustration 4.2: Student makes connections between the class reading and real life

Ms. Harper agrees that other students' perspectives and opinions contribute to "octopus thinking":

> I think that's what makes it invaluable is for them to see other people thinking about something that they've had to think about. And, they're not going to be 14 exactly same answers to the same question. And they don't always get to see what

> other people think about things. They hear what the kids say in class, but they don't get to hear everybody's voice and not everybody gets a chance to answer the same question. . . . [Y]ou can't have one question that you get to talk about for 20 minutes unless it's a really good question and you've got a really good class. . . . [W]here else can you have that? Where you have something that you want them to think about, and they all think about it and then they all get to see what everybody's thoughts were?

Ms. Harper indicated that by reading what their classmates had posted on the English 12 *Tumblr* blog, students "took some interesting angles," stating,

> that by seeing how someone else can answer a question that you saw in this black and white way, there was this whole other set of possibilities [and] that somebody can go really out there and have this really interesting answer is, I think, really enlightening for people. It allows students in their next post to take some risks and be a little more creative or to think differently if this does not come naturally to them. By seeing other's interesting posts, that student who is focused on the right answer will be more liberal in the ways that she is thinking about her own answers.

While a high level of thought and analysis was endemic to the assignments and their assessment, the tools helped students to see each other's ideas, interact with others, and find, use, and share information from outside sources. Students commented that having their classmates' work available in one place on *Tumblr, Twitter, PBWorks* wiki,

or *Google Docs* facilitated reading everyone's ideas. In reference to using *Twitter* for the Roman emperor project, a Latin II student stated that he didn't have to "go everywhere to figure out what other people are trying to do." Another commented that by using *Twitter* "we could go and look at, like, other people's brains and connect our brains to different people [and] share similarities on how emperors could be good or how emperors could need improvement. . . . [I]t helped in a lot of different ways." Yet another agreed, saying that he could learn from others' standpoints, viewpoints, and "seeing what others thought was most important about their emperor." Students in the English 12 class commented on the convenience of having all of the posts in one place, which made it easier to access their classmates' writing in order to read and compare responses. Kendra's comment expresses the sentiments of others: "It's like having a book of everyone's opinions and thoughts, but very easily accessible."

Ms. Harper declared that by freely posting to the *Tumblr* blog in the English 12 class, students were encouraged to relate things that they learned by reading or experiencing outside the classroom—relating exactly to a topic being discussed in the class.

> Students' posts became better as they went along," she related. "You know, I think that they were definitely were more comfortable with it and they definitely had more fun doing it, and I think they were probably quicker on their feet about it. That all came from seeing everybody else doing it. They learned by reading others' [blog posts].

Seeing everyone's posts on the class English 12 class *Tumblr* blog allowed students to get different points of view and to accept that it is all right for classmates to contradict their ideas. Kendra thinks that the class blog is necessary because she can see how everyone else perceives the information. "It is a new way to learn." Arianne agrees, adding,

> Sometimes it's nice to have different ways to learn which is what I think [the teachers are] trying to do. It's nice especially with the [blog] we do for English because you can see everyone else's posts and it's cool to read those and for them to contradict your ideas. That way, it's not as if you're reading someone's paper that they have to print out and hand to you and discuss. You can just read it online in your free time and see how it contradicts your own thoughts and realize that there is more than one way to respond.

The English 12 class *Tumblr* blog gave students a sense of security and confidence in their own ideas and writing. Elena thought it was better to read the class blog and see what her classmates thought about a topic instead of just turning in a paper for a teacher and not knowing what others thought. "It was interesting reading about other's opinions and the [blog] made it easy to access without email or printing." She does not believe that she would have the same experience and be able to learn the same things without the blog. "I can't imagine doing it without it."

When asked if students could have submitted the same results without the blog, Ms. Parker replied,

> I don't think so. I mean a lot of the questions that we asked were questions that we could have asked in a classroom, but one thing that the blog lets us do is it lets students actually bring in examples. So for that question about what's a time you've seen a native American portrayed in film, we could have asked that and students might have said, "Well, what about Pocahontas?" but the blog allowed them to go and find a particular picture, or find a particular video clip, and then essentially do a closed reading of it, say, "Here's what I want everyone to look at, and here are my thoughts about it." And we wouldn't have enough time to do that in a classroom, nor do I think it would really be possible in the same way.

Ms. Harper stated, "[The *Tumblr* blog] is not like a three legged stool [where] if you'd taken that leg out then everything would have fallen apart, but I think that a whole set of conversations wouldn't have happened." Ms. Parker also thought that the use of *Tumblr* allowed students to think about and engage in the content in different ways and "students would say that their experience was enriched and that their understanding of it is stronger because they used this blog to engage with it."

An examination of the blog found evidence supporting Ms. Parker's assessment. See Illustration 4.3 for an example of a student bringing in an example and offering her analysis on the blog.

Sep. 26, 2012 at 3:53pm with 2 notes

Like Wild Horses

http://crookedarrows.com/

Over the summer this movie came out called Crooked Arrows. It's about Native Americans playing lacrosse. Native Americans were the first people to play and it's origins are American. While the movie is humorous and a typical sports movie about an underdog team who finds a new coach to lead them to a championship with the support of the whole community, it reminded be of the "At Navajo Monument Valley Tribal School" by Sherman Alexie. Alexie talks about in this Indian reservation, there's a Tribal School where all of the kids from the tribe attend, but throughout the whole poem there's an analogie of the athletes sounding and looking like wild horses. I think this analogie is so important because through all sports if you close your eyes and listen to a bunch of people sprinting, it sounds like wild horses. In this way, the movie and poem connect. This poem reminds me of the movie Crooked Arrows mostly because of the sport aspect and because all of these people playing the sports are Native American. At the end of the movie, these Native Americans play against a preppy school where the only kids that play lacrosse are white jocks. The movie is a typical American sports movie, but one thing that draws, especially lacrosse players to it, is that it comes with the history of the game which is unlike many other sports movies.

Illustration 4.3: Example of student brining in outside examples and sharing her analysis of how Native Americans are portrayed in literature

Arianne suggests that the students could have each created an individual hand-written or word processed journal, but that she could not have easily added and shared

links to videos and pictures and that "tool wise, it's very helpful in new ways of figuring out [connections to the readings]" and that it couldn't be replicated in a journal because she "depended so much on the use of the internet to help [her] prove a point." One example had her posting a link to an interview with a singer-songwriter Adam Levine that she talked about in class on a particular day in a discussion about "womanizer vs. lover of women" so that her classmates could read the article for themselves. After a response to a prompt about the end of the world as portrayed in cinema, Arianne posted a link to a *YouTube* music video of the band Muse's "Apocalypse Please" to illustrate the points she made in the posting for her classmates.

Students in the AP Art History class had the similar reactions by reading classmates' posts on the class *PBWorks* wiki. "You can also learn new and different content or perspectives or ideas from your classmates' [personal wiki] pages," states Arianne, and

> see how my classmates contradict my thoughts. Sometimes it's nice to have your thoughts on a page and other peoples' of the same topic or same assignment so you can go back and look at them. . . . but I think it was helpful, just as a way to free [your mind] after you'd been discussing in class for a while.

Sarah suggested that having access to classmates' thoughts [and] writings "makes it easier to learn from them because you can read their materials in your own time." Pierce saw the value in getting his classmates' ideas to integrate with his own, finding it adds a level of interest to "get multiple perspectives on something." Kim discussed the

interaction that she feels the Art History wiki jumpstarts between students. Her classmates talk during class in small groups to answer a question posed by the teachers, but she states,

> . . . it's not, like, a big open forum, so to speak, like in English class or something. So I think, like, the wiki kind of promotes that you're getting to talk with fifty students, some of which aren't even in your period, but you're still getting to use their cartoons, their ideas.

Ms. Roberts affirmed what students allege to gain from reading each other's contributions. She wanted students to find real world applications so that students would be able to expand, beyond the scope of what they were doing in the classroom, out to ways in which art history becomes part of popular culture. So by having a repository of examples she found and using the class *PBWorks* wiki, she gave students opportunities to create "their own kind of going from the curriculum to real world connections." Looking at their classmates' original cartoons required that the student applied what was learned in class to see how another person applied that material in the real world." Illustration 4.4 shows an example of how Sally applied content learned in class to her interpretation of a Elena's art history cartoon.

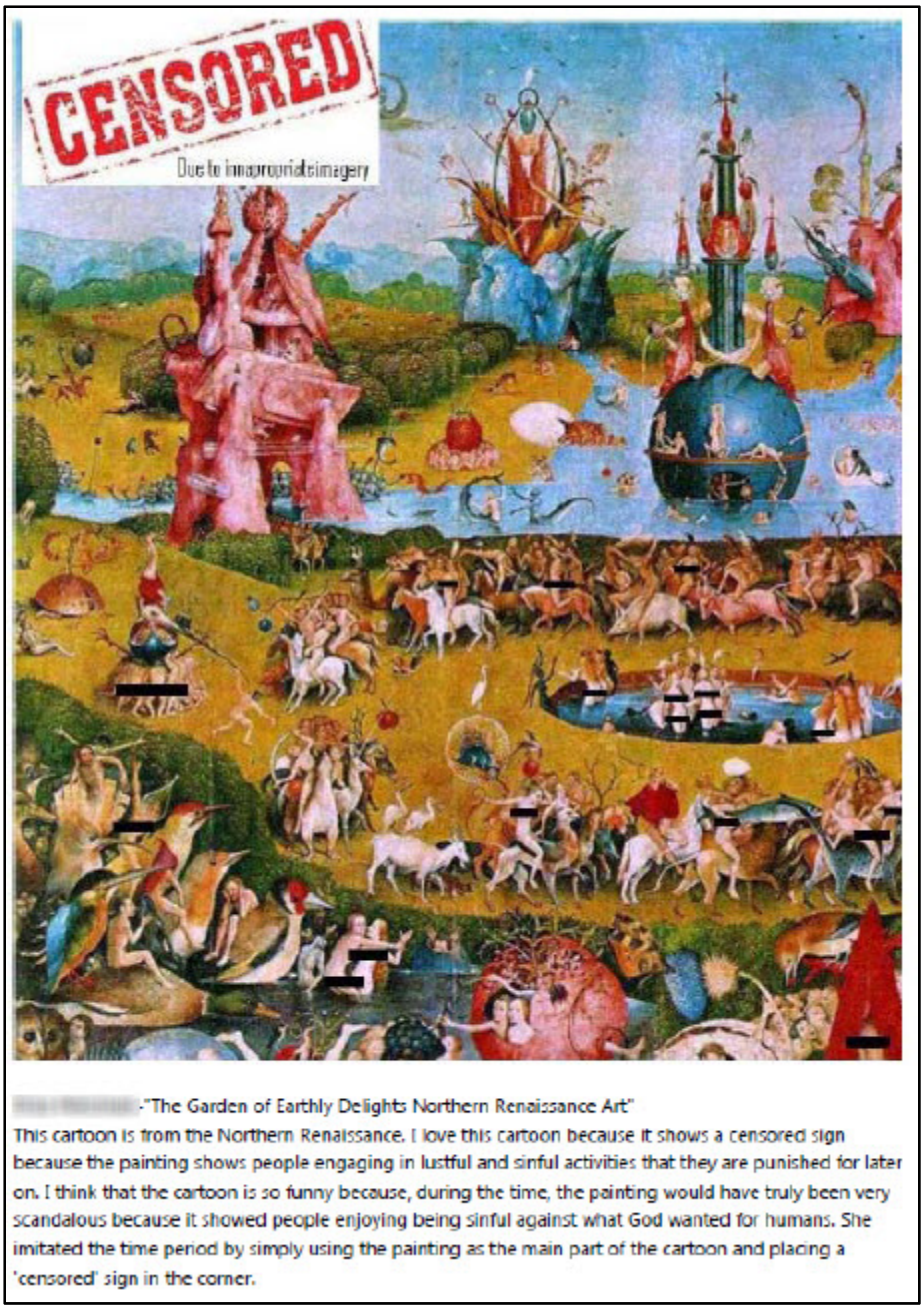


Illustration 4.4: Student's application of Art History content toward a classmate's cartoon

Students expressed the value in learning from perspectives that differed from those of their Art History teacher. Kim states it this way:

> There isn't just one way to look at something like a piece of art. Different people have different views or takes on what this means. I don't think that there is one right answer. I think that there are probably multiple right answers. And sometimes Ms. Roberts might say one thing and someone might raise their hand and say "What about this?" and she's like, "Oh, I didn't think about that, but it's definitely valid. It's definitely like a good answer to that question, it's just not what I thought of." I definitely learn from that, because I'm like, "Oh, I didn't think about it that way. I was thinking about it this way." So, it's not just Ms. Roberts just standing up there lecturing; it's kind of like give-and-take, I guess.

Harriet believes that the class wiki helped her to have more ways to interpret art, because while she thinks her teacher, Ms. Roberts, "does a very good job at teaching Art History, this kind of applied it in another way." Kendra also believes that her AP Art History teacher teaches in a very specific way and that

> some people interpret it very differently and having them put down what they think of a painting because everyone has a different perspective on painting, whether you're an Art History teacher or just a student, everyone is going to think differently of the painting. Being able to see everyone's opinion and I think especially in art history because it is so abstract, having everyone's information where I can just go through and be like "Hey, I wonder what Arianne thought of this picture?" and realizing that I've never looked at that painting like that before, but I totally see that and the next time I look at that artist, that's what I'll focus on.

Abby believes that “it is a great way to get different points of view” because with the individual wiki pages “you could see everyone’s different views, and their opinions and what they thought the [art] topics [on the Advanced Placement exam] would be.” Harriet stated that by reading how another classmate interpreted lighting in a masterpiece gave her a new perspective that she subsequently applied when interpreting another work of art. When asked if she learned additional content, she doesn’t think she learned more, but just applied what she already knew in a different way. She also feels that she learns from the notes of a past student that are posted on the wiki, for instance, she has “the pictures and little summaries, and if it is worded differently from how I did it, it kind of sinks in better because you are just seeing it in a different way.” Sally believes she can also learn “new and different content or perspectives or ideas from [my] classmates’ [personal wiki] pages.”

Using *Twitter* to show the results of research on Roman emperors and having to interact with the closest emperor chronologically succeeding and preceding one of the student’s emperors also helped students make connections that they would not have made otherwise if they had written a traditional research paper on one particular Roman emperor. Padman connected to his emperor’s father and his emperor’s son (both represented by other classmates). “[My emperor] Trajan was very popular in Roman culture so I connected a lot [of other emperors] with him because [they] had a lot of similarities and they connected with [mine] . . . like architectural and military achievements.” Indicating that, while he could have learned the same thing

about his emperor for the assignment if he did not use *Twitter*, he learned about other emperors through the interactions he had with them online. Illustration 4.5 shows the connection the student made between Trajan and Hadrian (his son).

Illustration 4.5: Example of the connection a student made between his emperor Trajan and Trajan's son, Hadrian

Param also found that *Twitter* helped him make connections through interacting with the other characters in the project and helping him to learn facts about Roman history, stating

> The *Twitter* project you know, it makes it look like we are actually doing something—it's not like a waste of time, but it seems more fun. It's more interesting to talk to other emperors and [post tweets] about them [such as], "Oh you did so and so, . . . and you destroyed an empire in . . . whatever year." So it kind of brings you back to how they actually talked to each other and how they respond to each other in the past, from one emperor to an opposing senator or something. I kind of learn better—it's just me, I learn better from technology.

Karen also discusses the historical content she learned from others' tweets that she would have missed if the assignment had required a traditional report, such as what war an emperor was a part of, when he took reign, or who died throughout her emperor's life. "Doing a research paper is a private product and everyone would not get any knowledge of other emperors. With *Twitter*, you have access to their pages and see everything they wrote," which helped with her interactions between the emperors. She felt that "get[ting] to relate to other emperors gave me an even better knowledge of them," such as what Hadrian did in this particular year and it reminded her of what her emperor did in his war. Illustration 4.6 shows how she applied the information.

Illustration 4.6: Student applying historical content gained from interacting on *Twitter*

"I interacted with emperors that were nearby me," states Braden, talking about the difficult nature of the assignment. ". . . that part was a bit weird, having to communicate with someone who lives 300 years before you in a completely different time, but it was also good to see some of the similarities between emperors. [T]hat part was hard I thought, to sort of find something . . . required a lot of searching through what you already had, and looking at other tweets. It took a lot of work." Illustration 4.7 provides an example of one similarity Braden found.

Illustration 4.7: A student applies the similarity found between his emperor and another

Students expressed similar sentiments about how *Google Docs* helps them learn from each other. Sally thinks that using *Google Docs* to make a group study sheet for the English 11 final exam gave her a different perspective on something that maybe she

didn't see. Cady talks about how sharing documents in *Google Docs* helps her find some clarity. After focusing on a given topic or problem for so long that she can clear the fogginess by seeing other's "two cents" on the subject. "It's nice to see what [my classmates] have to think and come from a different angle, a different view." She talks about having a definition in Environmental Science and being certain of an example, but then her lab partner would post a different definition and that would look a lot better. She has learned that someone else might have a completely different angle of what they think it is.

Janice agrees, expressing the manner in which *Google Docs* supports students who are

> working together, helping each other, and talking back and forth. The clarity and stuff. . . . I think that works really well. And when it comes to researching these things, you're on these really confusing websites with words from primary documents that you're just like, "What's going on?" So, you have one person deciphering that and you're deciphering your own stuff and what it's actually saying. It's easier when you have another student's language coming at you and not just [yourself trying to understand] all of these different documents from all of these really fancy primary sources.

Jumpstarting the Thought Process

A recurring theme throughout student interviews concerned "jumpstarting the thought process" by gathering and modifying the ideas of other students. Harriet talks

about how the Advanced Placement Art History wiki facilitated the assignments that required students to revisit their own and their classmate's former assignments. Seeing how her classmates were analyzing them would help her get ideas for her new ones. Arianne says that when she was lost or needed a little push on what direction to go, that she could look at classmates' personal wiki pages to "jumpstart" her own thinking and see what direction she needed to take the assignment. Bryan concurs saying that he "frequently goes to other people's pages, look at what's getting their thought process in motion, using it to help got my own thought process rolling." Sally also thinks that looking at her classmates' pages on the wiki gives her a place from which to draw ideas. Pierce uses the wiki to determine how his "classmates' ideas compared and contrasted from his own and to get a general feel of what he was going for." Kim likes seeing what other people have done because it jumpstarts her own ideas—"[l]ike, '[O]h they did this, which leads me to do this.' It kind of causes me to think about that."

Malia said that her partner's information for the History 9 diary of the middle ages project helped her to "focus on the task at hand because I wasn't sure what was going on" (because she missed several class days due to illness). "If I get stuck, I can look at my partner's work on *Google Docs* to jumpstart my thinking and figure out the key things I was missing. If it was something that answered one of the questions and I'd have to go and research it and get more facts on it and the notes really did help."

Iris feels that by looking at her other group member's notes on *Google Docs*, she could see what her partner was thinking about the History 9 project and use the ideas that she had about the topic to figure out what she should write.

Table 4.2 summarizes the conceptual category of broadening perspective and its properties and dimensions

Broadening perspective	Properties	Dimensions
	by seeing how others answered a question or responded to a prompt	that he or she saw as having only one answer
		or thinking that the teacher was looking for a particular answer that the student did not have
		to compare responses to get a different point of view, allowing the student to accept that it is alright for his or her ideas to be contradicted and to accept that there are multiple answers, not just one right answer
		being able to see what classmates thought about a topic before turning in or submitting work provides a sense of security in student's own writing
		enables the student to learn new content supported by other students bringing in extant materials
		finding clarity
		clearing foggy thinking
		coming at a problem from a different angle or point of view
		increasing comprehension from the language of another classmate
	by making connections between	real life issues by bringing in outside materials
		themes in subject-area content by bringing in outside materials and through other students' perspectives
		historical content
	by jumpstarting the thought process	ideas for how to start student's own assignment
		see what direction to take an assignment
		compare and contrast classmates' ideas to his or her own and make modifications as needed
		get a general feel for an assignment
		focus on the task if confused
		get an idea of how the student's partner(s) are thinking in order to be compatible with own contribution

Table 4.2: Conceptual category of broadening perspective and its properties and dimensions

DEVELOPING SKILLS

Using Information from Sources

The result of many school research projects is often to cut-and-paste information found in sources with little higher level thinking or synthesis applied. The students in Mr. Mann's Latin II class, however, demonstrated sophisticated use of information from multiple information channels such as library databases, books, and *Wikipedia*. Students used information by determining what was relevant to their need and then applied it in a different context. Mr. Mann felt that using *Twitter* to assume the role of a Roman emperor was a way for students to visually present their research and show an understanding of applying information.

> I think that the students, by having to take the information that they learned from sources and condense it into 140 characters . . . [n]ot only did they get a better understanding of what was really important in the information they read, but they have then been able, in my mind, to understand the full context of their emperor's reign better because they really get a full picture from birth to death of what happened.

He believes that what he refers to as "information processing,"—using information for the need at hand—is more important than retaining facts. He explains the importance of information processing:

> The benefit I saw in this project and this is sort of one of my beliefs in the future of education, is that I really feel that, in the future, there is going to be a lot less information retention, and a lot more information analysis—being able to take

> information that is readily available, but apply it to your needs. So, I bet, if I quizzed some of these kids, they might not be able to remember all of the dates in their emperor's reign, but they took that information and made it meet their needs and created a product that was really interesting. The information is still just as accessible for them because they can either look it up on their own *Twitter* feed or go back to *Wikipedia*; all that information is still there. But I think that the skill the kids developed in this project is how to process the information. I mean Roman history is exciting—there's lots of tawdry details. But I like that they took what is relatively banal information of dates and wars and rulings and death, and they got to create a persona out of that.

Karen confirms, saying that the *Twitter* project helped her practice getting the

> treasure out of the information. You can't just write a long passage. [W]hen you tweet [post on *Twitter*], you only get 140 characters so you have to get to the point, get the real fact out of it, and put it on there.

Breelyn asserts that the main thing that she took away from the Roman emperor assignment was the

> ability to say all of these things that mean so much in so few words. You had to figure out how to incorporate everybody's death in just one tweet. [I]t's a good way to figure out how to consolidate your notes. (See Illustration 4.8.)

That skill transfers to her English and History classes. She states that she knows that by posting concisely on *Twitter*, she learned how to take the "important bits and

make sure that I have that information. In English and History I used to highlight everything. Now I just highlight only the things that I think I would be able to retain if I had a quiz."

Illustration 4.8: Student condenses many deaths into one tweet

Callie thought of it as a problem to solve—fitting everything

> into this certain amount of time and it has to be a certain amount of tweets. . . . and how am I going to do this? But once I came out with a few things [and] I thought, "Oh, I get this! I can do it!" And overall I found it effective and it was a way I could learn.

See Illustration 4.9 to see how Callie processed the facts from information sources.

Excerpt from Callie's notes on the Emperor Titus Flavius Caesar Vespasianus Augustus:

- The Eruption of Vesuvius
  - When: 79 AD
  - Where: the towns that were destroyed in the eruption of this volcano located near Naples include Pompeii, Herculaneum, and Oplontis
  - It was significant because it devastated a relatively important area of the Roman Empire and led many people to have their first encounters with what we now know as volcanoes. Pompeii and Herculaneum today have especially become centres of excavation and research on Roman life. Titus is significant in this event because he was well known for his relief efforts towards the victims of this disaster

How she uses the information in the emperor's tweets:

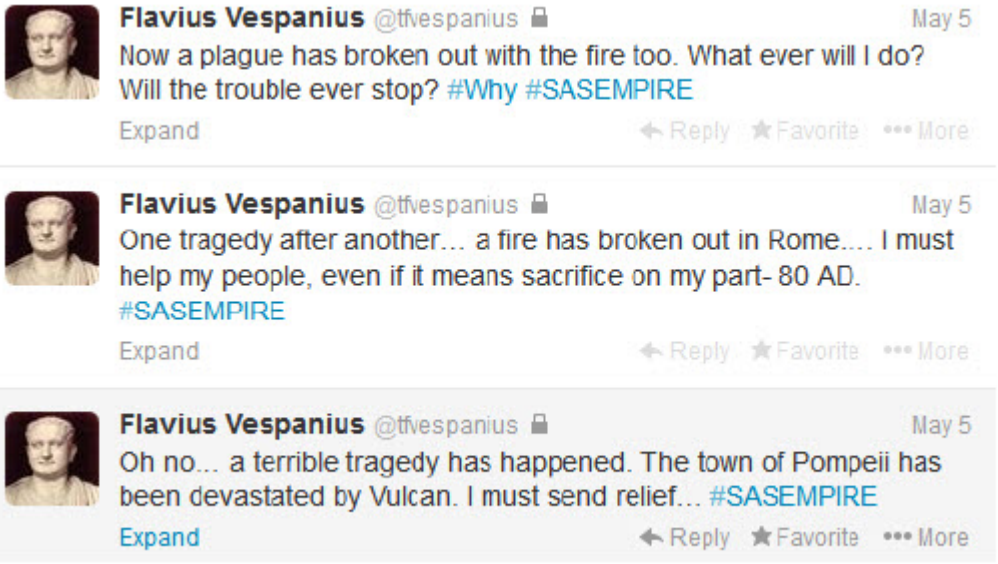


Illustration 4.9: Student processes facts from information sources

Padman explains it this way:

> You had to shorten the information to make it succinct and get your point across. I know I have trouble making things succinct, taking out what's key information, so that helped me with that a little bit by putting it into *Twitter*.

Param also found that

> [Posting in *Twitter*] helps you. I actually had problems of running on and on and on with assignments. It helps you get straight to the point and slim it down. A lot of my teachers want me to do that, and it just helps you get to what's important.

Table 4.3 summarizes the conceptual category using information and its properties.

Using information	**Properties**
	Determining relevance
	Appling
	Condensing and summarizing
	Synthesizing

Table 4.3: The conceptual category "using information" and its properties

Critical Thinking and Creative Expression

A goal of teachers' extended use of new media, such as the *PBWorks* wiki in AP Art History and the *Tumblr* blog in senior English, as well as for shorter assignments such as using *Google Docs* for the Public Service Announcement in Environmental Science and the class webpage for Anatomy and Physiology, the diaries of the Middle

Ages in History 9, and *Twitter* for the Latin II Roman emperor project, was to encourage students to exercise critical thinking and creative application of information and ideas.

Critical thinking

"I think that we really used [the English 12 class *Tumblr* blog] as another place to exercise critical thinking," surmises Ms. Harper, "and that, of course, is one of the skills that the Humanities [faculty] really wants to instill in them by the time they graduate. It was just another place for that to happen and for us to be assured that was happening, because we could see it happening, rather than, again, hoping that it's happening in a discussion in class." See Illustration 4.10 to see how Kendra analyzes a passage from a work of literature she read in class, and Illustration 4.11 for Harriet's evaluation on an article about the apocalypse.

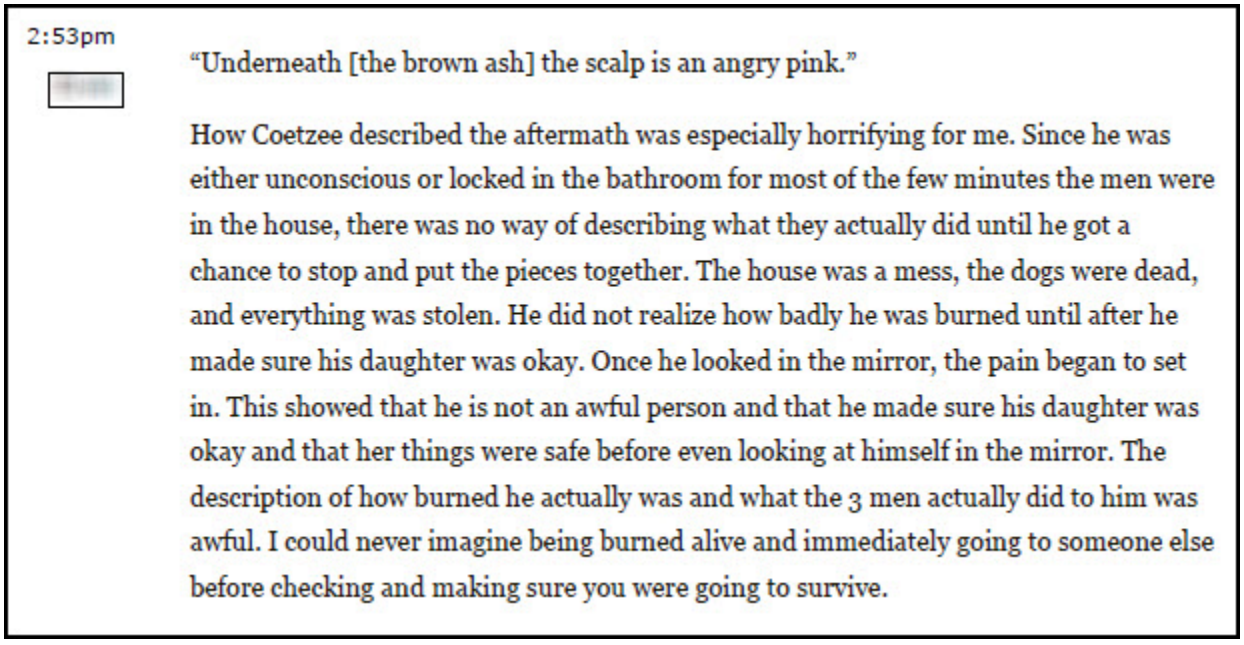
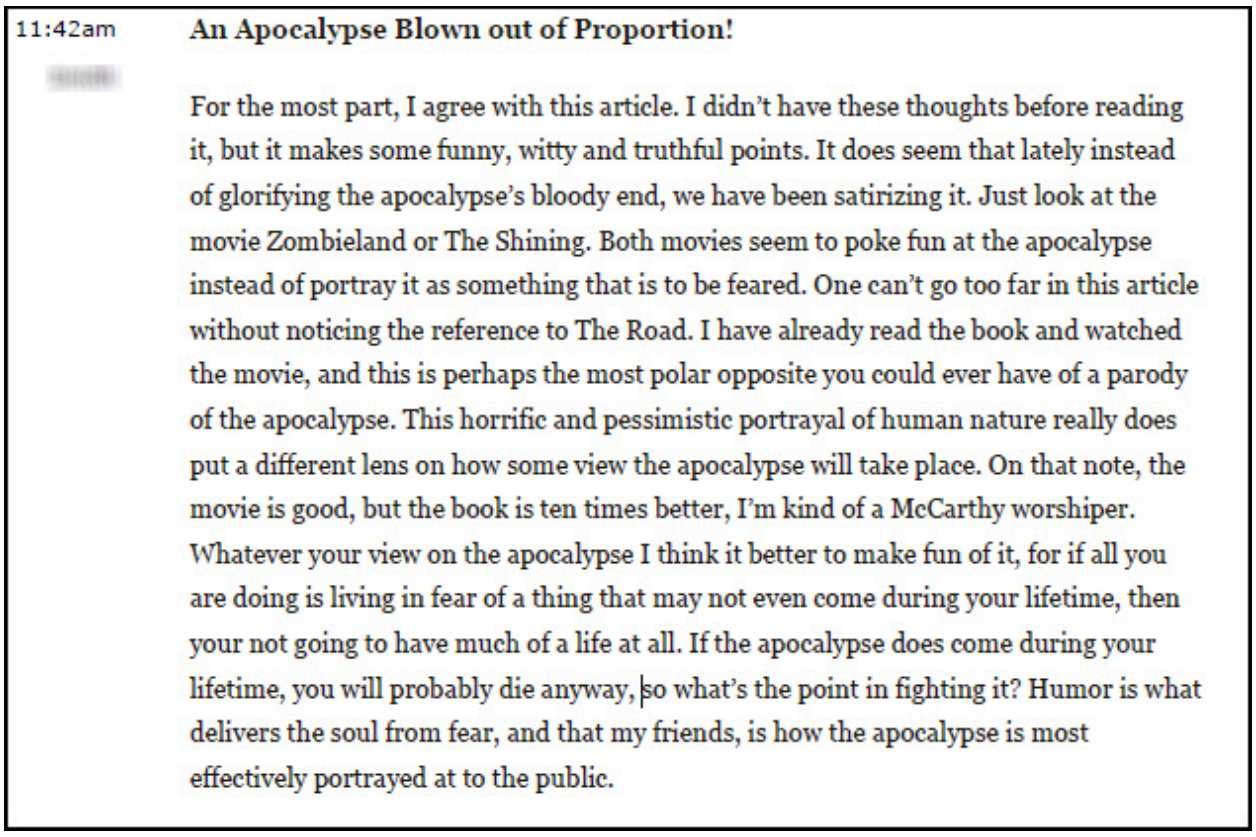


Illustration 4.10: A student analyzes a passage from a work of literature


11:42am

An Apocalypse Blown out of Proportion!

For the most part, I agree with this article. I didn't have these thoughts before reading it, but it makes some funny, witty and truthful points. It does seem that lately instead of glorifying the apocalypse's bloody end, we have been satirizing it. Just look at the movie Zombieland or The Shining. Both movies seem to poke fun at the apocalypse instead of portray it as something that is to be feared. One can't go too far in this article without noticing the reference to The Road. I have already read the book and watched the movie, and this is perhaps the most polar opposite you could ever have of a parody of the apocalypse. This horrific and pessimistic portrayal of human nature really does put a different lens on how some view the apocalypse will take place. On that note, the movie is good, but the book is ten times better, I'm kind of a McCarthy worshiper. Whatever your view on the apocalypse I think it better to make fun of it, for if all you are doing is living in fear of a thing that may not even come during your lifetime, then your not going to have much of a life at all. If the apocalypse does come during your lifetime, you will probably die anyway, so what's the point in fighting it? Humor is what delivers the soul from fear, and that my friends, is how the apocalypse is most effectively portrayed at to the public.

Illustration 4.11: A student evaluates an article read in class

The Art History wiki gave students a space to think critically. Arianne noted that the Art History wiki assignments helped her form and analyze her own thoughts and to "pick apart our own brain and what we thought" such as the "abstraction behind what the artist was thinking and what [we] thought the artist was thinking and how it contradicted the artist's thinking. When we created our own wiki pages, it was all of our own thoughts. I thought that was a really cool way of learning Art History, especially because sometimes it can be kind of objective, just knowing the artist and title." Presenting results on the wiki promoted the students to "have a lot of free reign with what [they] say and

how [they] can express [their] thoughts." Illustration 4.12 shows Arianne's critical analysis of a classmate's Art History cartoon.

Illustration 4.12: Student analyzes a classmate's work

The Roman emperor assignment completed on *Twitter* also required students to think critically. Mr. Mann:

> I think it added that extra level of analyzing the knowledge that the [traditional research assignment] didn't. On the [traditional project], the kids could take research notes and then copy and paste it from their research notes into some sort of presentable format. The third phase of [this] project [required them] to do a series of tweets where they either compare or contrast an event in their emperor's

reign to an event in another emperor's reign and tweet to that emperor. Or they have to reflect succinctly on another emperor's success or failure based on their read of that *Twitter* feed.

Illustration 4.13 shows how Padman compared his emperor's reign, and Illustration 4.14 demonstrates he thinks critically by making a succinct reflection.

Illustration 4.13: Student compares his emperor to another

Illustration 4.14: Student makes a succinct reflection

Callie found the requirement engaging. "I had to compare and contrast other emperors to my own—why they were similar or different, good or bad. I learned more and just got interested and kept going on to a lot of [my classmates' *Twitter* feeds]." Illustration 4.15 shows how Callie compared her emperor to another.

Students in the Anatomy and Physiology explained, for example, the physiology of improvement. One group explains that in order to improve at cross country running, a

runner must vary intensity, run hills, sprint, do plyometrics, strengthen core, and be consistent and explained each category. One example is how they explained "be consistent":

> It is important to give your body a break but by training year round runners are able to start each year at a higher base fitness level than the year before. This means that runners will be able to use all of their hard work from last year to be even better the next year. If runners completely stop running they will have to spend time at the beginning of the next season trying to get to the level of fitness where they left off. It is important to take time off. Your body would not be able to function if a runner trained for a marathon all year round, but it is important to stay in good shape the entire year if runners want to improve. Even if a runner does not run everyday, it is important to stay active in other ways such as cardio or yoga.

One group of students in the Environmental Science class analyzed the number of students who carpool from each of the school's attendance zip codes. Students in the History 9 analyzed how their character might react to the events of the times as noted in this diary entry:

> Dear Diary: I am very worried about my husband, King Henry. He will not share any of his troubles with me, but I know he is upset. He pretends that everything is okay but I can see right through it. I have been fortunate enough, or sneaky enough, to intercept letters between Henry and Thomas Becket, now the

Archbishop. Sadly, this is how I came to know of his distress He is worried about a new court case... one involving a bishop Hopkins. The bishop has allegedly stolen money from the church and there is discord about whether he should be tried in a royal court or church court. Thomas Becket... that awful man who betrayed not only our family's trust, but the trust of the crown.

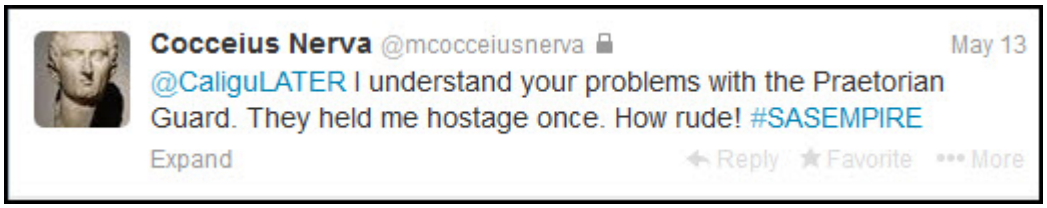


Illustration 4.15: A student compares her emperor to another

Table 4.4 summarizes the conceptual category critical thinking and its properties.

Thinking critically	**Properties**
	Analyzing
	Making abstractions
	Evaluating
	Comparing/contrasting
	Explaining
	Reflecting

Table 4.4: Conceptual category "critical thinking" and its properties

Creative expression and application of information and ideas

Ms. Roberts articulates the importance of the class wiki in exercising creativity within the Art History curriculum.

> [Students] would be able to learn the material of the class [without the class wiki], but in terms of extending its importance in their lives, I think the wiki goes a long way, making it deeper learning, more personal learning, more lifelong learning. I think it's very important for that. . . . The wiki allows for them to exercise creativity in a way that there's not time in our classroom to do, so that's one thing. Another thing is that what the wiki allows, and what I really try to build into the assignments, is the ability for their own artistic tastes, their own artistic passions, their own artistic interests to come through so that they can develop more of those artistic passions and likes and dislikes. I can encourage that with the wiki assignments in a way that I can't in the classroom. So, there's definitely that element that I would not be able to do without the wiki.

After viewing published cartoons based on masterpieces or other works of art, she required students to choose and analyze six, one each from specified periods in history, using specified criteria. The next assignment had students creating their own cartoons, either by modifying an image of a masterpiece or other work of art, or by drawing their own version. While some students merely added humorous captions to characters in masterpieces, many took a more novel approach. Illustration 4.16 demonstrate Elena's approach to the assignment.

Illustration 4.16: Student creates cartoon based on work of art

Proving to be a memorable activity, several of the study participants commented on the follow up assignment, which required students to analyze three of their classmate's original cartoons using the same specific criteria. Their appreciation for the creativity of their classmates was evident in their comments. Arianne thought "that was really cool

because we could see how creative other students were." Mandy expressed a similar sentiment. Illustration 4.17 shows the comments she made about one of Sallie's original cartoons.

I love this cartoon because I think that it is also very funny. She has the sculpture who is about to throw the discus saying, "Go Long" to someone that he will apparently be throwing the discus to. This is funny because we usually look at this piece to study the classical period characteristics of it, like the calm face and the perfect body type, but here we are looking at him as almost like a football player, not like a perfectly sculpted body. We never think of him as throwing the discus to a person, but just as an idealized human form throwing a discus. For this to be funny, you would have to be able to figure out that the sculpture is about to throw the discus, but in the context of the sculpture it isn't to anyone and in the cartoon it is to someone. The cartoonist imitates the artwork/ period/ style by using the original piece but just having it say something.

Illustration 4.17: A student comments on another student's humor

Creativity took another direction in the Environmental Science class. Students created original public service announcements based on environmental issues students identified around Independent High School. Their teacher, Ms. Tobler, wanted students to "express themselves" and only required elements that would typically be found in a PSA (all of which were brainstormed by the class). Students at the high school voted on

the PSA based on “qualities of humor, film aesthetic, and service to the community” with “Lil Nature Recycles” winning the contest. Illustration 4.18 shows a portion of the script and a shot from the video, featuring Prince, with Reina in production—both study participants. Both students commented on having a lot of “fun” and getting to “express themselves” while making the video.

Environmental Science FINAL PROJECT

Rapper = LIL Nature

- Visiting
- Whenever he sees [redacted] students not recycling, he gets really angry and starts to rap.
  = person throws Coke can on the ground and walks away

Video editing

- 1. News reporter talking about lil nature coming to St. Andrews

a. News Reporter: "Multi-platinum artist straight out of Compton named Little Nature is coming to Austin, Texas to visit [redacted] He is coming to continue his mission to get kids to recycle. He is mostly known for his most famous single "Hey gas stay out of the ozone, that's the no zone" and his two famous album's called "I don't burn trees, I hug them" and his most recent release "Don't roll trees, breathe them"

b. cuts from nick after 'his mission to get kids to recycle'

c. shows close up of Lil Nature walking, he then stops and poses.

d. he says, "Ay whudup youtube it's the kid Lil Nature straight outta Compton California reppin that tree game, remember don't burn trees save em nah mean."

e. Lil Nature keeps walking, camera pans to show him, he has a recycling box strapped to his back as if it was a backpack.

Illustration 4.18: Students demonstrate creativity in planning and producing a PSA

Mr. Mann and his students saw value in the creative expression supported by the Roman emperor project completed on *Twitter*. He talks about that aspect and the requirement for students to develop a personality for their emperors:

> One of the coolest things [was when] a few [students] also just went to town with developing other *Twitter* accounts for assigned emperors and other characters. Giving personalities to the emperors added a level of creativity and merriment to the task and students had free reign to develop a personality if it wasn't known. Students developed appropriate personalities for the known emperors, [for instance] Theodosius was a hyper religious Christian emperor who said "Praise Jesus," or the such after each tweet and showed them in interesting ways. You've got an emperor's wife [and] you've got [an] emperor's horse. . . . Kids had to add their own narrative or editorial perspective or lose points if they just wrote the information found in resources. . . . and they have to develop a personality for their emperor so they really have to get a vibe of what's going on in that emperor's reign and what happened to the empire at that time. And some of them developed personalities for their emperors that I thought were pretty far off the mark of what I thought that emperor's personality probably really was, but they were still taking the information and going another step into analyzing what that information actually meant in the context of what was going on.

He further talks about Breelyn taking creative license with Emperor Caligula's horse, Incitatus. She creates "a playful, prideful horse that Caligula made a consult. Not a lot of that was historical information, but she really played with it." Pausing for a moment, he continued, "They were able to take the information and analyze it and be creative with it. It feels like that was truer than any other project I have given."

Breelyn confirmed her creative role as the Emperor's horse while she wove facts into her tweets. She talks about having free reign to develop the emperors' personalities, and being able to create other characters as chosen. "It was fun, and hilarious." She continues to explain the creativity in developing the personality of the horse: "Caligula, after he went insane, he had this horse and he tried to make his horse senator, and he fed him gold, like he put gold leaf into his feed, and he gave him a marble stable. He would have Incitatus invite people over to have dinner in his stable, and he had maid servants and everything. It was quite the trip." When asked about the giving the horse a voice, she replied insightfully,

> Well he's become kind of a sassy horse that misspells everything, because he's a horse. . . . It's mostly just him replying to other people's tweets about Caligula, or him talking about something Caligula did. Like when Caligula went from senator to emperor. I think I made a tweet about that like, "Yeah, my boy is emperor now!" It was some stuff about him getting poison from the gold leaf, like he couldn't type right, so it was just a whole series of letters. It was fun to do stuff like this but you also had stuff where you would just compliment Caligula or you

would talk to another emperor and be like, “Oh hey, don’t talk to Caligula like that!” . . . In creating different characters surrounding an emperor’s life, through the interactions with other emperors, it was really just a plot development of Caligula as a whole.

Illustration 4.19 puts her explanation in context.

Illustration 4.19: A student takes creative license with an emperor’s horse

Heath demonstrated how he creatively elaborated on the facts from sources by "exaggerating things from [the emperor's] point of view." For example, he tried to be creative by giving each emperor a "distinct feel—one who is very decisive and one who likes to screw around." (See Illustration 4.20.) He applied a creative spin on events such as losing a battle, and by role playing through a *Twitter* identity, he thought about how the emperor would say it rather than how it was stated in the secondary source. "I didn't lose the battle, your soldiers just overwhelmed mine," instead of just reporting about losing a battle. Heath also asserted that he could not have learned as much by writing a good research paper.

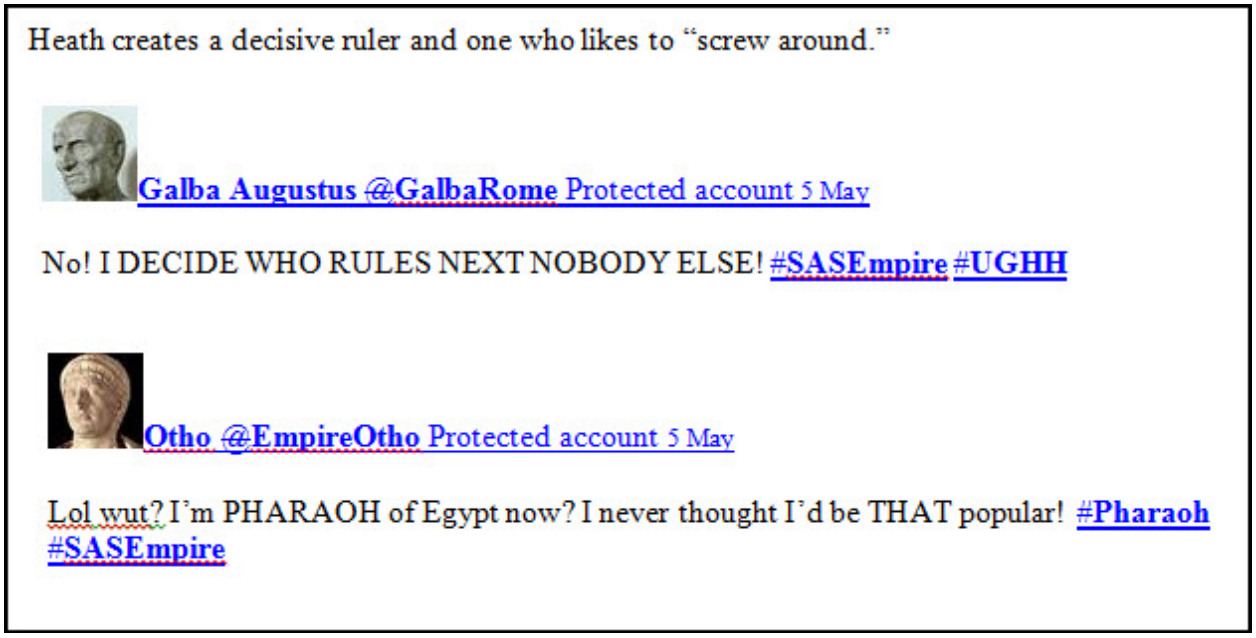


Illustration 4.20: A student creates two different personalities for his emperors

Padman talks about his emperor being known as a “boasting, powerful emperor, who at the same time could be nice.” So he tried to be “bashful but kind of condescending at the same time.” He felt that while it was difficult to do, he thinks he got it across. Illustration 4.21 shows how Padman tries to show his emperor as “bashful, but condescending.” He says, “You have to take the research and then sort of give the character a personality.” Callie agreed, saying that the creative writing aspect helped her learn the materials she needed to know, but in a creative way that was enjoyable. And, she added that [because of the Roman emperor assignment] she “likes liking school.”

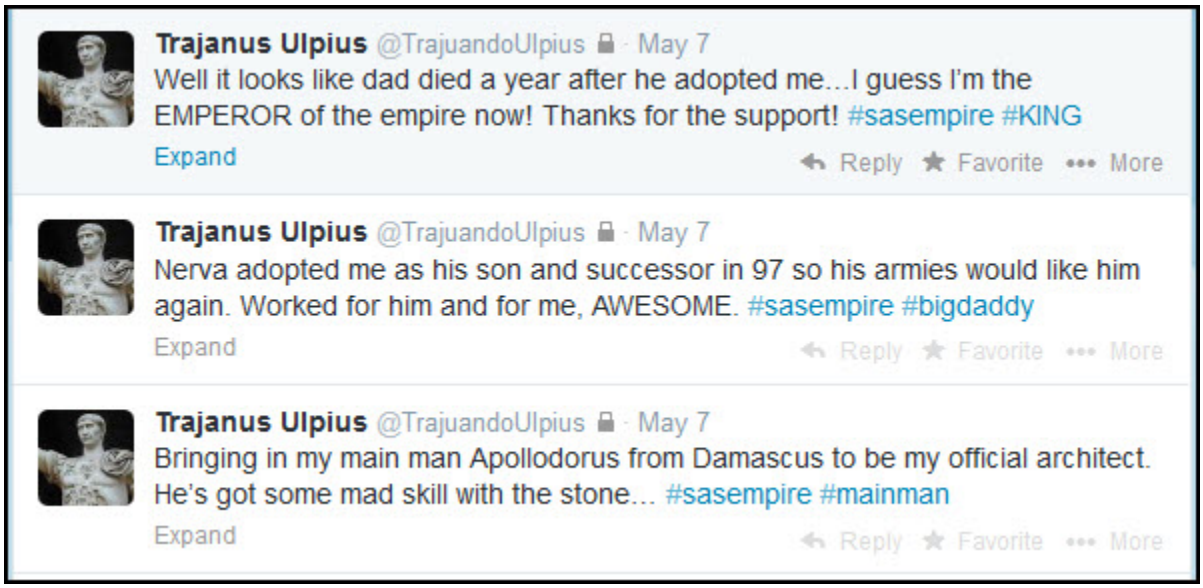


Illustration 4.21: Student creates a “bashful, but condescending” personality for his emperor

Karen felt that *Twitter* helped her demonstrate her creativity by how she worded hashtags[1] and her application of the facts from her notes (see Illustration 4.22), explaining that "[I]t makes you understand it more. You get [to use] your own creativity by how you word them and compile them into a tweet." She also appreciates the creativity of her classmates and notes how their "creative twists on their tweets and their facts made it fun to read."

[1] Wikipedia defines a hashtag as a word or an unspaced phrase prefixed with the hash symbol (#).Words in messages on microblogging sites, such as Twitter, may be tagged by putting "#" before them. Hashtags make it possible to group such messages, since one can search for the hashtag and get the set of messages that contain it.

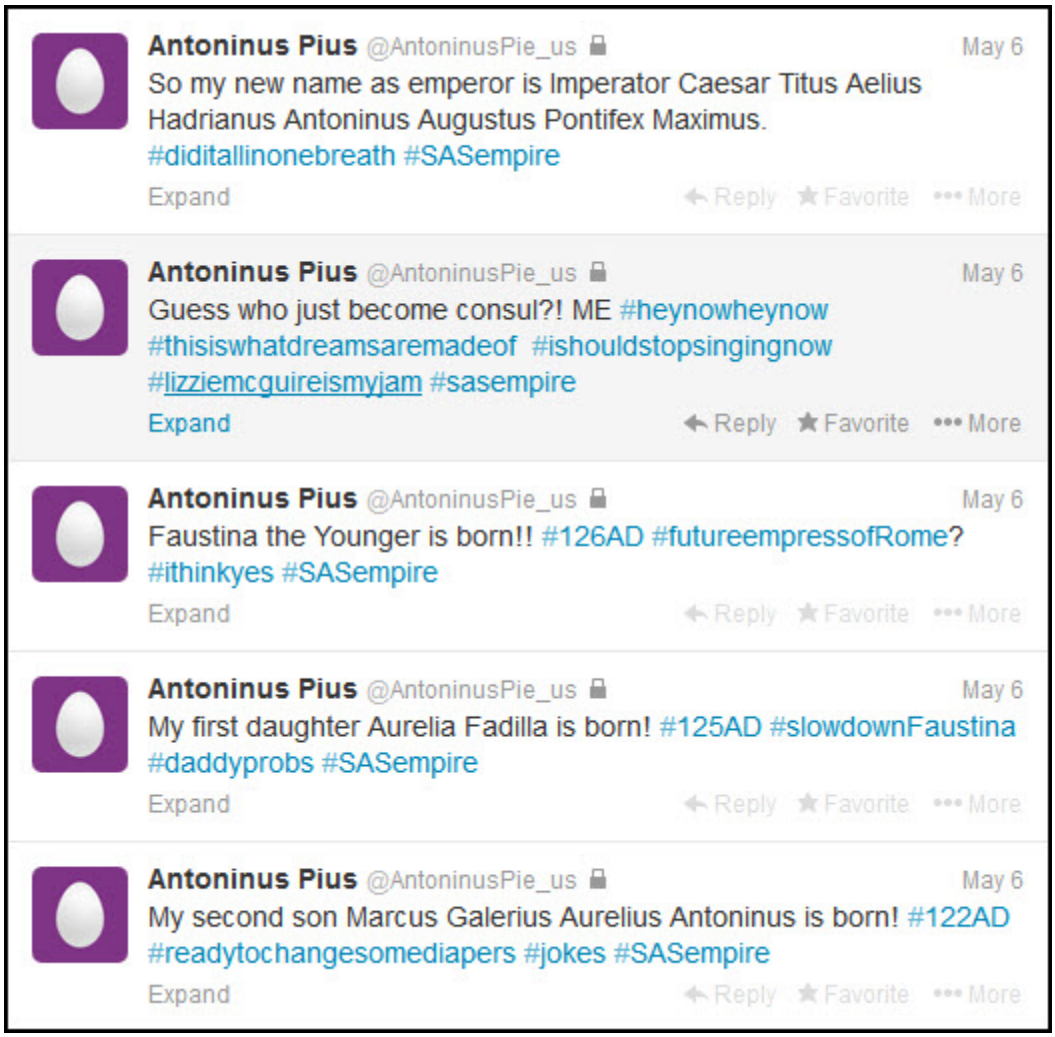


Illustration 4.22: A student gets creative with hashtags

Braden felt that it was a challenge to take factual information (his emperor made currency more valuable) and make that into something that was worthy of tweeting. He struggled with "how to turn this dry information into something interesting and fun to read." See his results in Illustration 4.23.

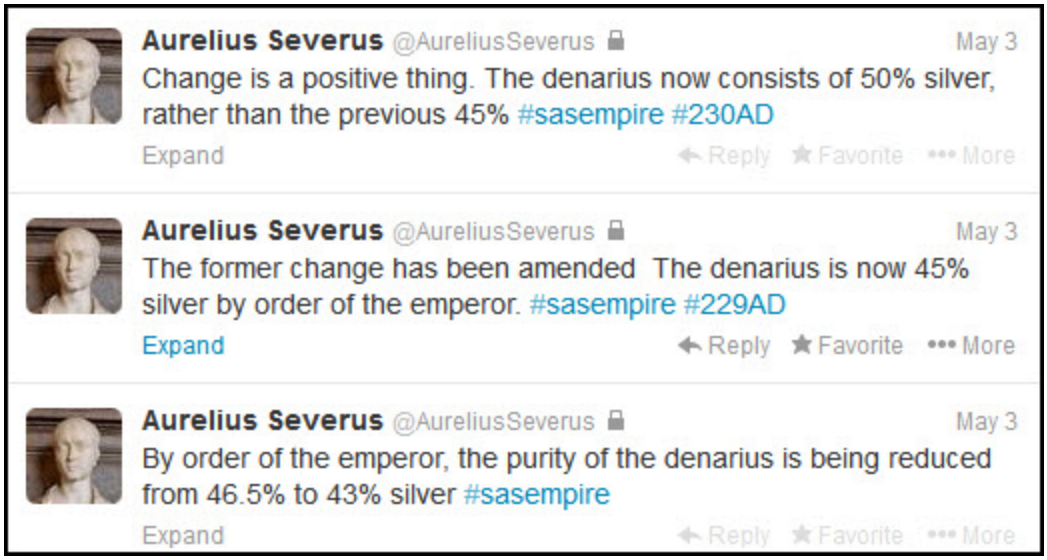


Illustration 4.23: A student writes creatively about a dry fact

Table 4.5 summarizes the conceptual category of exercising creativity and its properties.

Exercising creativity	**Properties**
	Taking a novel approach toward an assignment
	Adapting works of art
	Making original works
	Freely expressing oneself
	Taking creative license on factual information
	Using imagination
	Incorporating humor
	Exaggerating/elaborating facts
	Using language
	Writing dialog
	Fictionalizing historical events

Table 4.5: Conceptual category “exercising creativity” and its properties

Communicating effectively and efficiently

Students' awareness of how they should communicate online was notable. They discussed the importance of expressing themselves clearly when sharing documents via *Google Docs* and other new media. Sallie expresses it this way: "You have to be able to convey your ideas [on *Google Docs*] to other people so it's not just for you to have to understand—they have to understand it also. So you have to be more clear in how you write something down or they won't understand what you're talking about." Students expressed an awareness of using audience-appropriate language when communicating online. Elena stated that students "need to learn how to [type email to teachers] because you'll still be communicating with your teachers. Or if you're communicating with someone important, even on *Facebook* [a social media website], you can do that. I think the AP Art History wiki helps refine those skills: "[It] definitely helps [in learning] how to handle yourself, which I think has been the big impact with the [AP Art History] wiki, because you learn how to communicate online and what's appropriate for going online, what's not appropriate [and] how to use sentence structure. Some things that are okay for emails to your friends aren't okay for emails to teachers, professors, jobs—things like that."

Param talks about the difference in communicating online and face to face: "Yeah, I mean sometimes there's things you want to talk about face to face [when working remotely in *Google Docs*] and it's hard to do that [using the chat feature]. Say you want to say a lot. It's hard to type out a lot and send it to them, and they don't feel the emotion of what you're talking about to that aspect. So I think some things you need

to say face to face, but [when] there's some things it's nice to say online, [then] *Google Docs* makes it really fast, really simple, easier."

While students extolled how easy *Google Docs* made working remotely with group members, they were also quick to place value in face-to-face interactions and challenges of communicating through new media tools. Kendra expresses the downside of communicating online saying, "You lose the interaction with people if you're too focused on just typing something up and just sending it to the internet." Arianne puts it this way:

> I think it kind of eliminates the discussion part of a project, like being face-to-face with someone and saying, "Oh, I think this is a good idea, I don't think this is a good idea." It sounds more harsh on the internet when you're like, "This is a bad idea, period."

When asked why he prefers communicating face-to-face, Ben replied,

> I feel like just seeing [the person]. It's just, like, asking someone to prom. You want to see their facial expression when you do it. I don't know. There are a lot of things you can say on the computer, like, over chat that are so, you think it sounds right, but it comes off really snarky. And you're like, "Oh I'm sorry I didn't mean that to happen."

Reina is not a *Google Docs* fan and feels that one cannot write everything in *Google Docs* nor would anyone want to record all that takes place in a face-to-face discussion. "I think that it's just more effective through [face-to-face] discussion."

Table 4.6 summarizes the conceptual category of communicating online and its properties.

Communicating online	Properties
	expressing self clearly for benefit of others in the group
	identifying and using audience appropriate language
	communicating face to face versus online

Table 4.6: Conceptual category "communicating efficiently and effectively" and its properties

Collaborating on Group Projects

Students laud the benefits of *Google Docs* in facilitating group work in both a face-to-face setting and working together and communicating remotely. Making the group's work universally accessible from any computer or device connected to the internet in one shared space for group members is one of the main benefits that students described. *Google Docs* provides a central location in the form of online shared documents for group members to take notes, assign and complete tasks, and efficiently communicate for effective and up-to-date results.

Almost all students who commented about *Google Docs* discussed the advantage of accessing a shared document in a central online location. Janice expresses it this way:

> With other partners in which I hadn't used *Google Docs,* I'd email them and be like, "Hey, where are you? Could you send me this? I really need this information." And I'd either end up having to take extra time to research it myself

> or be really screwed over and the person was at a sports banquet or something and didn't have [the *Microsoft Word* document or] couldn't email it to me at the time.

In almost all interviews, students talked about the nuisance of emailing notes and documents back and forth, expressing the advantages of the online access of *Google Docs*, as related by Karen: "I really like *Google Docs* because you don't have to have the pain of, 'Oh, make sure you email me the notes, or email me this.' It is a shared document so you don't have to email it back and forth. That's nice." Harriet agrees, adding,

> It's easier than trying to email a document back and forth and edit and save it and email it, because you can see live when someone's typing, and then you can add onto that or you can chat with them on the side about it and then edit it right then and there—and that makes sense.

Janice stated that, while she and her partner could have completed the assignment and found the same information for their History 9 project without using *Google Docs*, it made the project easier by storing all the information in the same place and made it possible to access the same information with a partner. "But," she added, "*Google Docs* did not help with the goodness of the information."

Even when students worked together in a face-to-face setting, *Google Docs* provided a place for them to store data gathered in tandem. Classroom observations confirmed this as I witnessed students in five different classes working in small groups with a shared document open on each group member's laptop. Each group member would

research a particular subtopic, then copy and paste or type paraphrase notes into the shared document.

"*Google Docs* has made it a lot easier to get together and put all [our] thoughts into one document without having three separate things or two separate things," Abby states about working on the Environmental Science project. Prince adds that "you can upload [a] document [that you may have already written or located] and everyone can see it and it just makes it a whole lot easier." Harriet talks about the ease in using *Google Docs* for a group project, "[S]o we would just set up a [shared document] with all of us and we could add notes to it so we could all see it." Carter adds that "you can piece together what you are going to do especially for [presentations], so you can add your thing."

Heath finds that *Google Docs* aided in peer editing.

> [O]ne of the great things is that if you're writing a document on paper, unless you typically ask somebody, you're not going to get help with writing or spelling. You have to seek out somebody else. But with a group project [on *Google Docs*], if somebody sees your stuff, they can edit it, they can change it, they can do whatever they want with it. That makes it so much easier to have peer reviews.

Kim summarized the benefits of shared document access expressed by most of the students who used *Google Docs* in specific assignments: "It's all compiled into one place [and there is] no chance of getting too many [Microsoft] Word documents going around

at once. [It is] accessible for all involved. Easy to do. Not super high tech. Easy location, everyone can see it."

Dividing tasks

Group projects are often structured so that group members can cooperate and save time by dividing the workload among members. They may divide the topics to be researched or distribute the outside sources used to locate information about a particular topic, as well as allocating the procedures and tasks required to accomplish a project. Arianne and Karen referred to the division of labor as "divide and conquer." "It's just easier because the process goes by faster if you have one person do this, one person do that," exclaimed Karen. All students who mentioned this concept during interviews agreed that doing "half the work" facilitates completing the project. Callie adds that "because you have to rely on somebody else's notes for the assignment, you have to rely on the information that both of you have gotten. It is a lot of work to look all of it up by yourself, so you divide the work."

Resourceful students find that however they divide labor, they have more time to accomplish less work, and can then pool their resources and ultimately, as Iris states, "spend more time on the final project." They find that one of the benefits of *Google Docs* is that it simplifies the sharing of the notes they took from outside sources. Janice articulates it this way, when she and her partner divided their project research by subtopics:

> So with the project you're both researching something toward the same kind of thing, but with the one for History [class], we're doing a case on something with Thomas Beckett, the archbishop and all that stuff. And I researched with the role of the church and [my partner] researched Thomas Beckett. So, she needed my information to be able to write her part and I needed her information to know what to know what the Thomas Beckett thing was about. So, [posting our notes on *Google Docs*] really helps because you don't have to email the person and be, like, "Could you please, please, please send me this?" But you just go online and it's there and you have all the information.

Illustration 4.24 shows a partial set of notes about Thomas Beckett taken by Janice's partner. An examination of the Revision History shows that Janice's partner entered the notes.

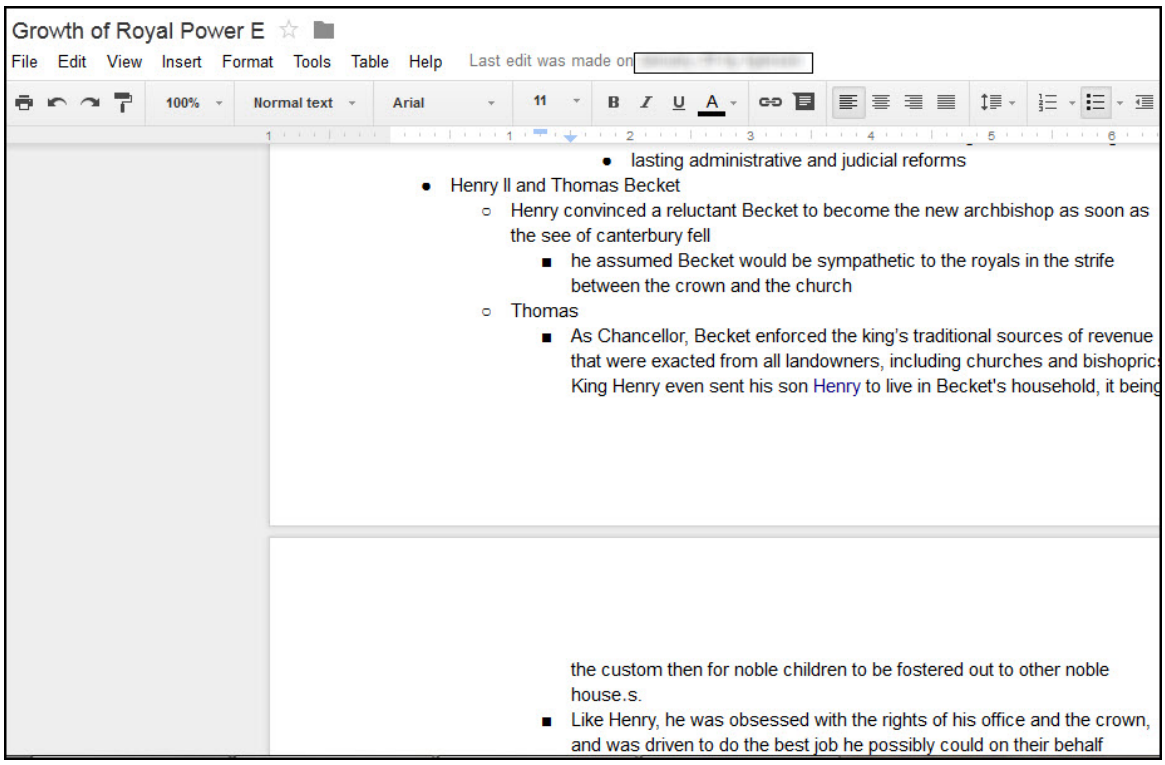


Illustration 4.24: Shared notes on *Google Docs*

Google Docs facilitates cooperation among group members by allowing one to partner to help the other by posting information found for the partner's portion of the assignment. Arianne posted links that were useful for partner's sections of their Anatomy and Physiology project. Karol also posted links for her partner to use in their History 9 project and added that her partner "could just click on it rather than trying to have her find it on her own. It's like shared—whatever I type is saved, and then if she opens it then it will be on there also."

Karen found that *Google Docs* supported knowledge sharing when she and her partner divided the information channels that they would access for information to satisfy the assignment.

> I went on ABC-CLIO [a library reference database] and [my partner] went on Gale [another library reference database], and so we kind of used the two different databases as different sources of knowledge so we could both talk about it. . . . "Oh so you got that piece of information, too? Yeah, I got that too, so let's write it down." So we kind of the shared knowledge that we're both really comfortable with and we both know it well, so that helps us to write our own [diary entries].

Students report that using *Google Docs* helps in dividing tasks and planning projects. Abby reports that her Environmental Science group put all of their tasks on it, which makes it easy to "just go to that and look and add things that we think are necessary or take away things we don't need anymore." Illustration 4.25 shows how Abby's group divided tasks.

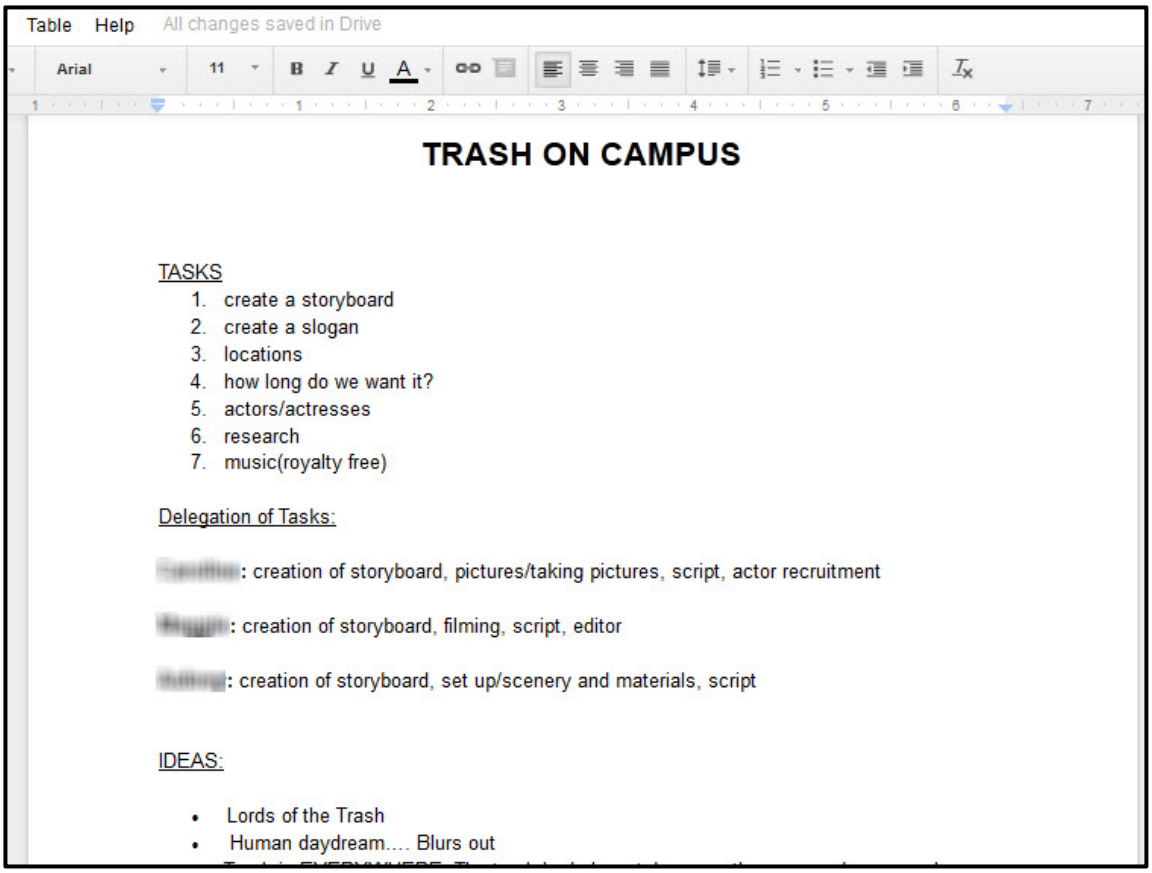


Illustration 4.25: A group uses *Google Docs* to divide the tasks on a project

Prince, in talking about his use of *Google Docs* for the Environmental Science project, added that it is a tool "just to make sure that everybody knows exactly what's going on without having to send it to a bunch of people at one time. So you don't have to send 20 emails." Rylie and her partner also used it for planning the Anatomy and Physiology project and reports that their document "looks like a mess. It looks disgusting. That is OK." Sally claims that *Google Docs*

> is really good for organization because we have all of our schedules on there [for the Environmental Science project] and we have what everybody is in charge of, and we're able to post as we get our things done off of our checklist. It was easier to lay out the jobs and split [them] up based on how long they would take. Then people could go in and change it if they thought of something different.

Illustration 4.26 shows how Sally's group used *Google Docs* for scheduling and task division.

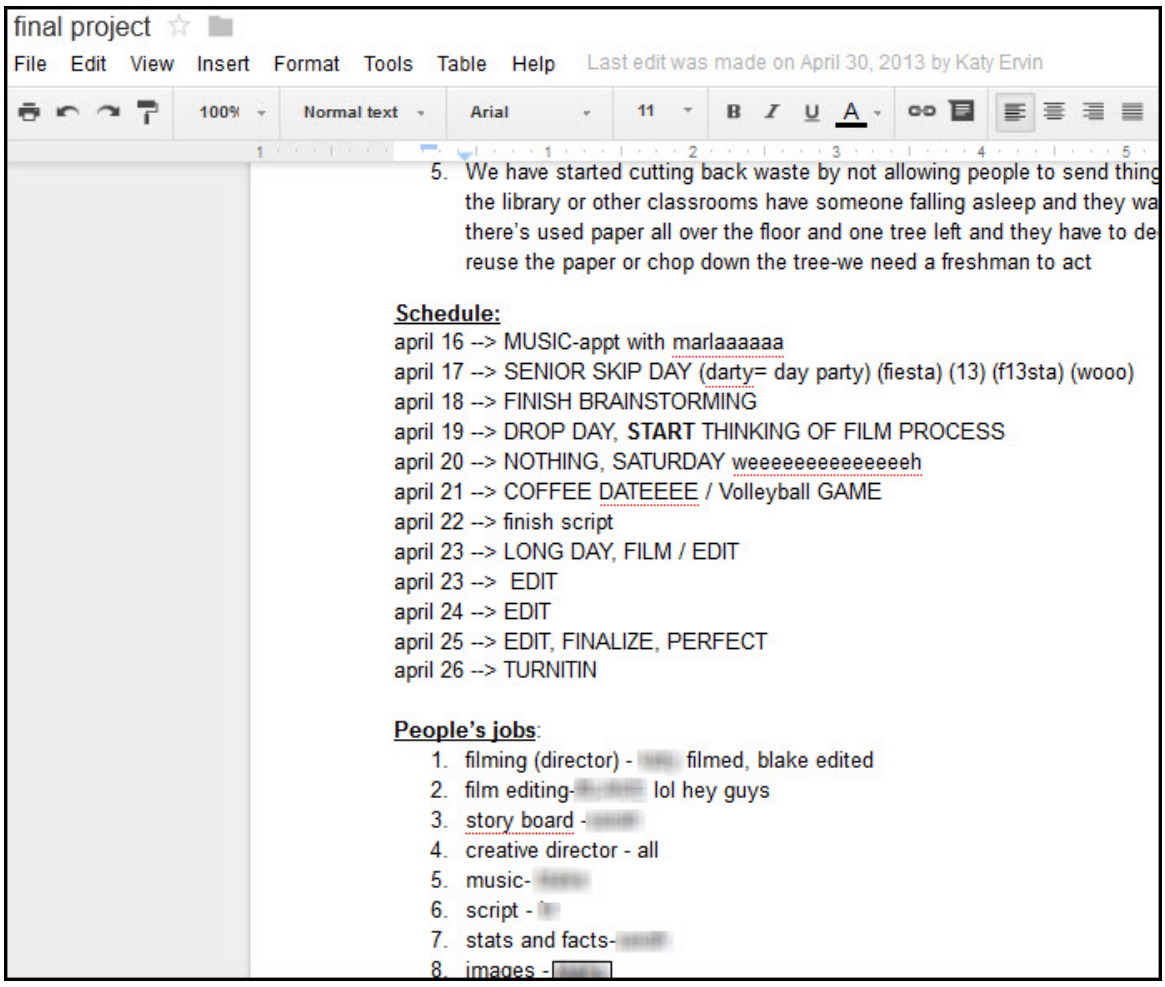


Illustration 4.26: Group uses *Google Docs* to develop a schedule and divide tasks

Individually accessing and editing the same document

What made *Google Docs* a useful tool for the projects studied, was its ability to serve as a shared document for remote access to facilitate collaboration among partners. Students extoled the benefits of accessing the site remotely, allowing them to work on the same document on their own time from home with the updates immediately available to

all group members. “It doesn’t matter what computer [we are] on, [we] can always access [our work]. Just bring up *Google Docs* and go to it, login, and you have your document right there and all the changes are saved in there,” Karen expressed about working on the History 9 project with her partner. Reina states, “[It] also meant that we did not have to organize times to meet face to face or even talk over the phone. It was just a lot faster and more efficient.”

Sallie notes that “everybody can look at the same thing and look at the automatic changes that have been made on it—fast and easy.” Automatic saving of work was a highlight for students. According to Karen, “[You] don’t have to worry about it not accidentally saving on your computer or, if you [forgot to] save it. It is already online and all the changes are saved in that drive.”

Olga found it useful when her laptop broke. She would go to her father’s office and use his computer to put her research for the Anatomy and Physiology project on the document she shared with her partner Rylie, who would use her laptop to access Olga’s work, which she would then put on the class project *Google Site*.

> It helped me because we couldn’t really communicate during class on what we were taking notes on. So, it helped that I could put stuff that I had done on paper on to something to give to Rylie so that she could just automatically copy and paste stuff onto the website. Then, it really helped because, when she [missed several days of school], I went through and added different subcategories that we would need to look at that I had found during my interviews. . . . So, whenever

> she came back, the first few days we went through and each of us would have a different section but, I could always go back and update something if I found something that had to do with the tibia muscles, even if she had already edited that day. Interview transcripts were easily available.

Editing and communicating synchronously

Participants found that *Google Docs* allowed them to work on projects with classmates while in the comfort of their individual homes while communicating and editing the document in real time. Iris noted that she can use *Google Docs* at home to get the same ideas as she would if she and her partner were working on their History 9 project in a "face-to-face" setting. Kendra's comment explains what many students expressed about working remotely and communicating and editing in real time.

> [*Google Docs* allows us] to work remotely but simultaneously. Partners [are] all at home on the weekend using [the built-in] chat [feature] to figure out what to do and ask opinions on contributions. My partners were at home this past weekend. On Sunday, we all went into *Google Docs* at a certain time and it was just a place for us to all be together and I would type, "OK, someone work on the script for a couple of minutes" and I would see someone else typing and then, be like "Any ideas?" and then someone else would respond with an idea. So, it's kind of like having the ability to all get together and work together but not having to actually be together.

Heath adds, “[O]r having to go over to someone’s house, look up what they did, show them my document and then go home, edit my document, print it out, [and] show it to my partner. [*Google Docs*] is just kind of a lot more centralized.” Reece talks about communication being important when a two or more people work together. *Google Docs* allowed working on the document at the same time without having to have any other means of communication open. He calls it an “all-in-one tool for group work.” Param declares that “people are busy and just want to be at home [and *Google Docs*] lets them be in their own environment at home, and you can still collaborate with others online about a project. [You] don’t have to meet up at a place,” adding that it “saves you a lot of time and makes it more enjoyable.”

Cady talked about using *Google Docs* remotely with her two group members for the Environmental Science project. “[My partners] and I were pretty much on it the same time. We each did our section and went over each section together and we were talking on it too, because the chat is nice. We could discuss putting things here and there. So, I really like *Google Docs*.”

Holding group members accountable

Working in groups has both benefits and drawbacks and when asked about what makes group work successful or challenging, students overwhelmingly spoke of the partners they are assigned. All participants suggested that a weak partner could bring down the quality of the work, which usually affected the grades of the entire group. Students appreciated being able to see their partner’s contributions and monitor his or her

progress in real time as immediate updates on *Google Docs*, finding it easier and less awkward than asking in person if the work was getting done. Heath states it this way: "It is easier than going, 'Hey! Did you work on the art project last night? I did my part.'" Janice finds that *Google Docs* helped her manage the progress of weak partners.

> [It] was really helpful because I could watch what these kids on *Google Docs* were doing and in all honesty I haven't had the best partners this year. So it was good to make sure and do fact checking and [determine if] they knew what they were talking about. . . . [T]here was one specific project in winter where we all had to use *Google Docs* and that was really helpful because I could see on there if my partner was actually working or not. And most of the time she wasn't.

Param reports that "you and a couple of group members can get on someone because it shows when someone edited something and [we can confront an errant group member by saying], 'We know you haven't done something, you got to do something,' if the project is due in a couple of days." Elena suggests that partners can both hold each other accountable by "being able to go into the *Google Doc* and see what we both have done [and if] we have done equal work. It keeps us honest and responsible."

Not all students agree with the benefits of monitoring each other's efforts and contributions. Rylie adamantly states that monitoring does not work for her because her partners think she is a "slacker" because she waits until the night before it is due to complete her part of the project and "does good work." She believes that her partners do

not know that she will get it done. She adds that they don't trust her, "and they shouldn't, because trust no one."

Assessing student work

Formative assessment.

Students expressed value in teachers monitoring their work through *Google Docs* by offering advice and encouragement during the process. Iris expresses it this way, "[T]eachers can give you advice or help or push you in the right direction if you need it or [are] doing something wrong. If you are not doing enough work, then they can *kind of* say, 'Hey! You need to get this done. You only have this amount of time left.'" Karen agrees adding, "[a]nd you can share it with your teacher so they can view it to make sure that [we are] on track and [are] up to date and so they can help the student make sure that [we are] spending [our] time wisely and getting the project done."

Summative assessment.

Kim discusses the benefits of *Google Docs* keeping group members honest in reporting to teachers what each contributed to the final product:

> . . . before having access to *Google Docs*, you know, it's just the teacher who [would] see the final [group] product and [depend on] what [each person would] say that they [contributed]. With *Google Docs*, [it] is that you're typing all the information out and seeing what each person did, and it's not like you can just copy and paste someone else's words and put it in for yours. You can actually see,

> "Did this person pull their weight, or did this person slack off?" Which I think is really nice. I really like that.

Teachers see the value in using the Revision History in *Google Docs* to determine the group's progress and the extent to which each student contributed. Ms. Kemp accesses the feature to "see who does what" and to see "who contributes and who edits," giving her an extra level of accountability. She feels that having those extra checks is useful, as well as being able to tell her "who did what and when." Ben knows that his teacher, Ms. Tobler, requires students to share documents with her in order to see if they have done the work. More than one student would like for teachers to use the Revision History feature, expressed this way by Carson:

> I wish the teacher would look and see who has entered the information into the document. Because I know that you can tell like, "Blank Blank did this, and Blank Blank did that." [F]or this document it was just all me, and my partner didn't do any of it. And [my teacher] didn't grade that fairly I don't think.

Not all students want teachers to check to see which group members contributed to a project because not all groups use *Google Docs* as a shared document. Reina asserts that

> [It] just makes me nervous because our group will have just one person taking notes on their laptop as we are working face to face and it looks like the rest did not do anything. [My] partner said, "You need to go on *Google Docs* and change

stuff so it looks like you did something because it looks like you have not done anything and you have."

Table 4.7 summarizes the conceptual category of collaborating and its properties.

Collaborating	**Properties**
	accessing documents in one shared space from any computer or device connected to the internet
	taking notes on a shared document (dividing topics and/or information channels used for research)
	helping a partner with his or her share of the note taking
	working on a shared document or editing partner's work on the same document asynchronously
	dividing project tasks and developing a schedule for completion
	working together on a shared document in a face to face setting
	working together on a shared document in remote locations in real time, using chat feature
	monitoring progress among group members and communicate with those who are lagging
	checking quality and quantity of group member's contributions
	assessing student work summatively by teacher by monitoring progress of group and individuals and checking quality of work
	assessing student work formatively by teachers by formally assessing the group and individual students

Table 4.7: Conceptual category "collaborating" and its properties

Conclusion

Insightful and comments by teachers and students, examples of course documents that corroborate claims made in interviews, and classroom observations, all provide evidence supporting the seven conceptual categories that emerged from memo writing and theoretical coding: Increasing participation, broadening perspective, using information, thinking critically, exercising creativity, collaborating with others, and communicating efficiently and effectively. The discussion in chapter five will further

analyze each category and its place within appropriate extant literature, as well as presenting a model that demonstrates the relationships among the conceptual categories.

Chapter Five: Developing a Grounded Theory

DISCUSSION

The research question—**How can the use of new media in high school curricula support subject-area knowledge building and development of 21st century skills?**—is answered by the findings.

The study examined individual student wiki use, blogging, microblogging, and document sharing in six high school subject areas: Ninth grade History (one project integrating document sharing), Latin II (one project using microblogging), Advanced Placement Art History (five assignments with results posted to individual wiki pages), twelfth grade English (ongoing integration of blogging), Anatomy & Physiology (one project integrating document sharing), and Environmental Science (one project integrating document sharing). Findings suggest that the use of specific new media tools support subject-area knowledge building, both explicit and tacit, by promoting participation among all students which in turn helps students broaden their perspectives through universal access to their peers' thinking. Findings also suggest that the integration and use of these specific new media tools support the development of selective 21st century cognitive and interpersonal skills.

Building Knowledge

When I proposed to explore how new media support subject-area knowledge building in high school courses, I was thinking about the type of knowledge that is privileged in schools, that which is explicit (Brown, 2000, p. 15; Eraut, 2000, p. 114;

Thomas & Brown, 2011, p. 77; Von Krogh, Ichijou, & Nonaka, 2000, p. 9), the kind that can be articulated, put on paper, and captured in drawings and can be transmitted to others by a teacher, a textbook, or an encyclopedia and given back to the teacher on a test or in an essay—the "know what" kind of knowledge.

From the initial analysis of transcript data through final presentation of the findings, what surprised me was that that much of the knowledge that students gained from their use of new media was not solely of this expected explicit kind, but that which is not so apparent, nor easily assessed or transferred—what is referred to as tacit knowledge. Polanyi (1966) defines tacit knowledge as a "way to know more than we can tell" (p. 18). Tacit knowledge, that which deals with "know-how," is best "manifested in work, practices, and skills" (Brown, 2000, p. 15). The tacit "lives in action and comes alive in and through doing things, in participation with each other in the world" and "[a]s a consequence, tacit knowledge can be distributed among people as a shared understanding that emerges from working together" (Brown, 2000, p. 15). Tacit knowledge "grows through personal experience and experimentation" and is an "experiential process as well as a cognitive one" (Thomas & Brown, 2011, p. 77) and the authors add, "[i]t is not about being taught knowledge, but absorbing it." Much of tacit knowledge is learned implicitly which is characterized by "unconscious process" and yielding "abstract knowledge" (Reber, 1989, p.219).

Explicit knowledge

Students did indeed gain explicit knowledge in the course of engaging in the subject-area content and the new media that teachers used throughout the duration of the class (AP Art History and English 12), or selected to support a particular assignment. Through the use of the *PBWorks* wiki in AP Art History and a *Tumblr* blog in English 12, students made connections between their own lives and the prescribed course content by thinking critically as they analyzed and compared information from outside sources and shared those associations with their classmates. Using *Twitter* to assume the role of a Roman emperor by creating his character and using factual information while connecting with other "emperors" helped students make historical connections and place their ruler in a broader context. *Google Docs* features allowed students working collaboratively on a project to see and use their partners' notes for writing a diary entry for the Middle Ages (see Illustration 5.1 and Illustration 5.2), demonstrate knowledge about the anatomy and physiology of sports training (see Illustration 5.3 and Illustration 5.4), and collect new data for an environmental public service announcement (see Illustration 5.5). Students articulated the role that new media play in their learning. Braden felt that he could have learned the same things about his emperor if he had written a research paper, but "doesn't feel like he would have been able to get the broad range of information about other emperors and fit it into context." Arianne expresses the role of the *Tumblr* blog in English 12 this way:

> We probably could have done a journal, which definitely has a different feel because you can't really look at other people's [journals] so easily and you

definitely can't find links to videos and pictures so easily. You would either have to print them out or describe the video. So, I think it wouldn't easily be replicated, if at all. We depended so much on use of the internet to prove a point and to access classmates' ideas.

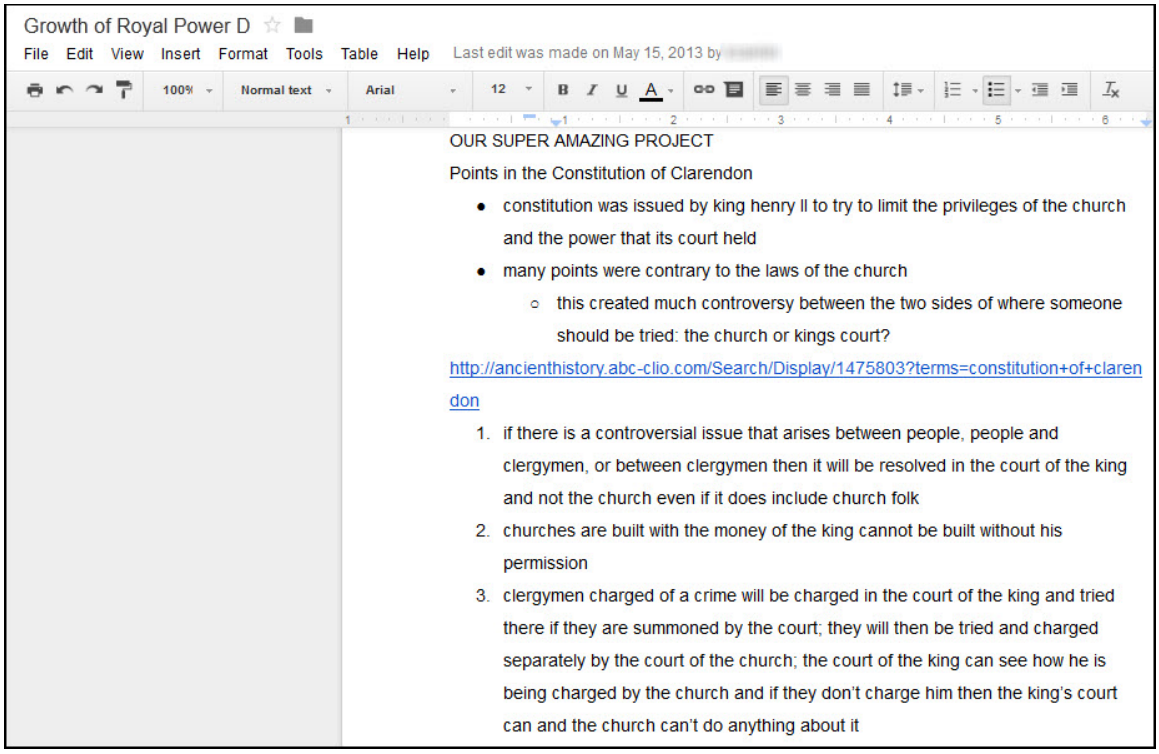


Illustration 5.1: Students share note taking using *Google Docs*

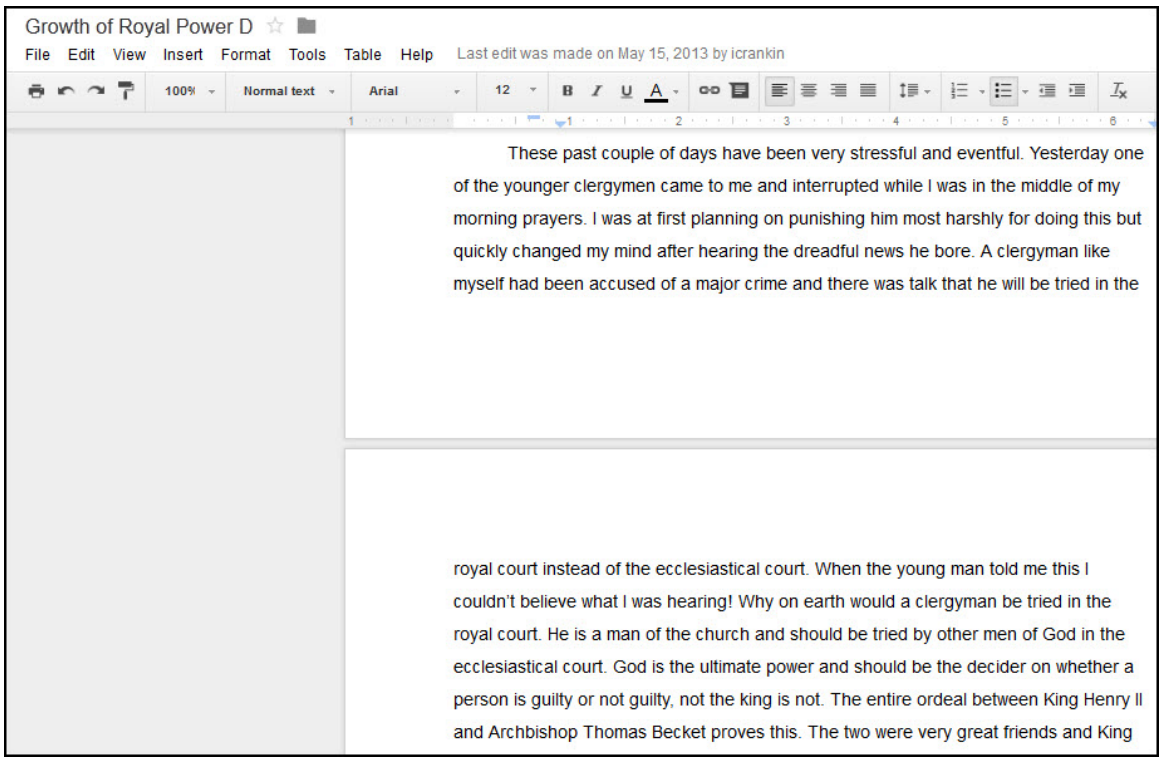


Illustration 5.2: Student integrates notes into a diary entry

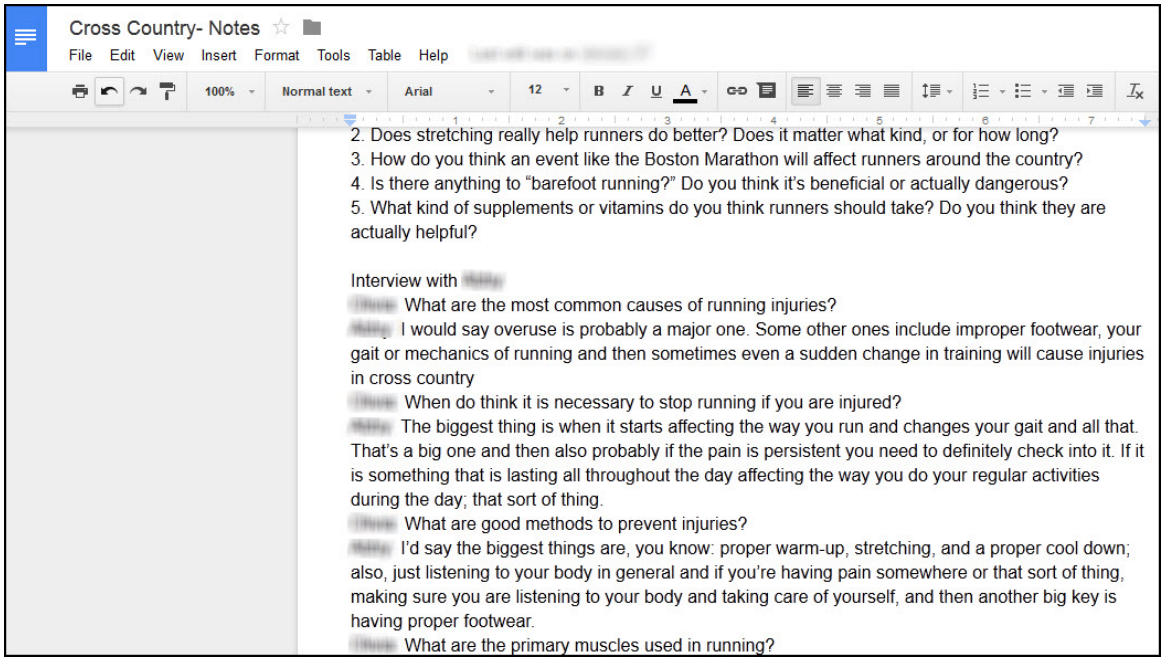


Illustration 5.3: Notes taken from an interview entered in *Google Docs*

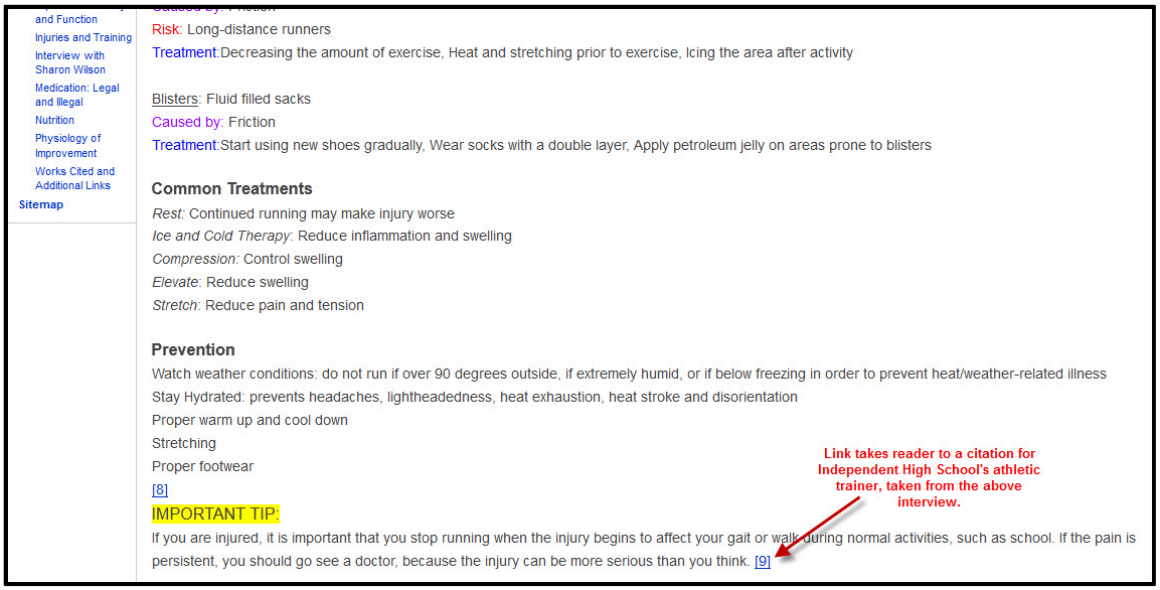
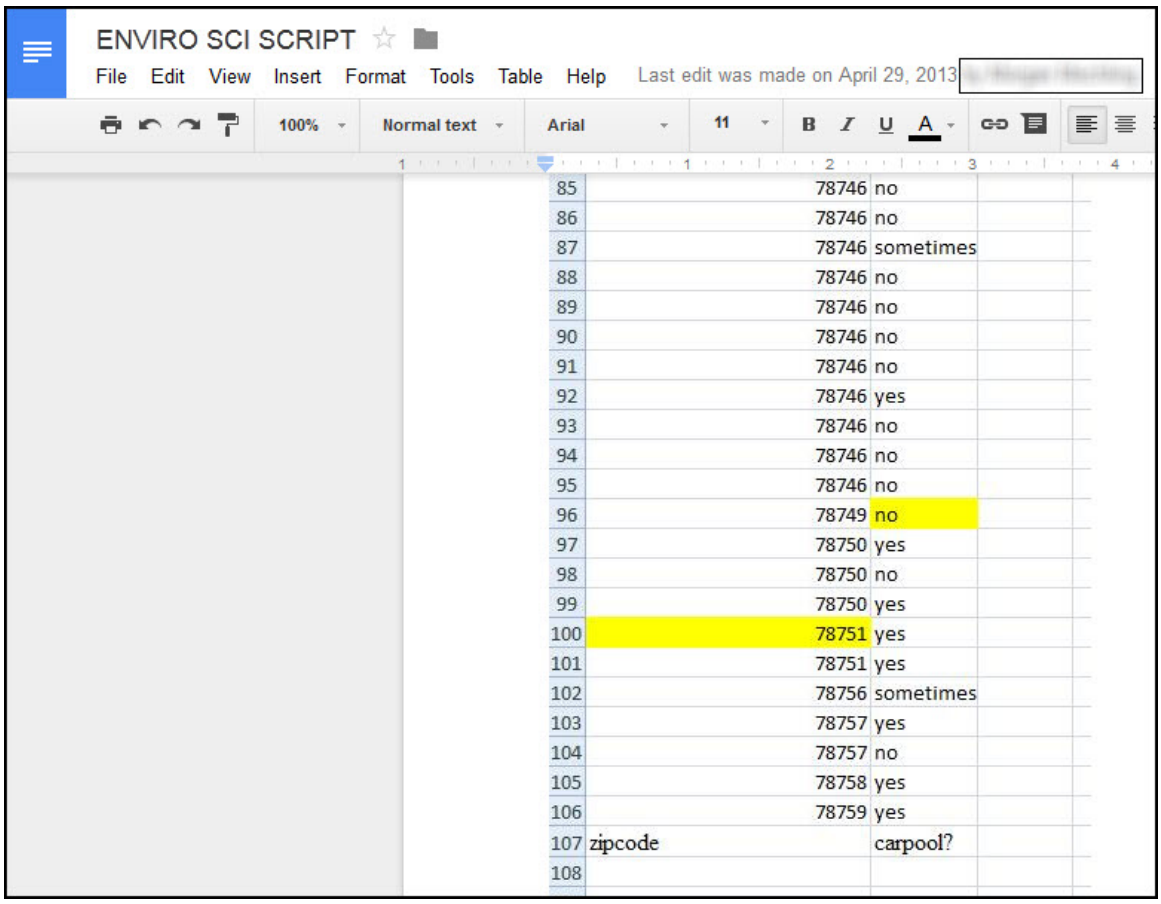


Illustration 5.4: Students use notes from an interview to build a sports training webpage



85		78746	no
86		78746	no
87		78746	sometimes
88		78746	no
89		78746	no
90		78746	no
91		78746	no
92		78746	yes
93		78746	no
94		78746	no
95		78746	no
96		78749	no
97		78750	yes
98		78750	no
99		78750	yes
100		78751	yes
101		78751	yes
102		78756	sometimes
103		78757	yes
104		78757	no
105		78758	yes
106		78759	yes
107	zipcode		carpool?
108			

Illustration 5.5: Data collection in *Google Docs*

Tacit knowledge

Students and teachers suggest that the use of new media tools in the classroom supports knowledge building (often in tacit ways) by broadening students' perspective through making connections between subject area content and their own lives, and by "seeing the thinking" of their classmates, made visible through new media via central online access. The central tenet of the most common theories associated with current

pedagogy—behaviorism, cognitivism, and constructivism—is that learning occurs "inside a person" and does not account for learning that occurs "outside of people, [such as] learning that is stored and manipulated by technology . . . [and the common theories] fail to describe how learning happens within organizations" (Siemens, 2004). Learning that is typically privileged in schools is of an individualistic nature. Students are often discouraged from studying together so that they are not perceived as cheating or representing the work of another as their own. They may be required to write and sign a pledge on papers and exams indicating that they received no unauthorized assistance[2]. The findings suggest that students can learn from each other, even in an implicit manner, and it is sanctioned by their teacher because the teacher made the new media tools available. Using *Tumblr*, *Twitter*, *PBWorks*, and *Google Docs* technologies supported that kind of implicit learning, often resulting in tacit knowledge. Students and teachers did not talk about the facts transferred through the use of new media in the curriculum. Instead, they focused on putting knowledge into context, applying it, making connections among popular culture and literature, doing better work because the student is concerned about what others think of her intellect, and promoting participation because the tool makes it easier for a student to participate. Tacit knowledge is what students learn from each other and how they process information. While explicit knowledge was indeed gained over the course of the assignment, students talked about that which was implicitly learned through the use of the new media, and not so easily transferred.

[2] Students at Independent High School are required to hand write or sign an academic pledge on each major assignment: "I have neither given nor received unauthorized help on this assignment."

Increasing participation.

One of the most significant findings of the study suggests that new media enable written participation by all students and provide a platform for participation by those who, for various reasons, do not speak up in class. Sadauskas, Byrne, & Atkinson (2013) report that students "consistently described sharing writing with an audience beyond just one teacher as 'exciting'" (p. 279-280). In reflecting on a project where students created a public blog as a class that received local media attention, one student shared that having a wider audience is better than just the teacher

> because I [can] produce something that could make a difference and someone could look at it and look at my ideas—someone outside of school, someone I don't even know . . . [and that person would think] that was interesting, [and I could do that] through technology. (Sadauskas, Byrne, & Atkinson, 2013, pp. 279-280)

Teachers also found that eliciting digital responses encouraged students who are usually shy in class to share thoughtful ideas that would not be voiced otherwise. Similarly, a student added: "Behind the computer screen it's so much easier to talk to the person" as there are 'not other people around' listening." (Sadauskas, Byrne, & Atkinson, 2013, pp. 279-280)

Written participation also allows for extending class discussion, which results in more thoughtful written expression and allowing teachers and classmates to "see" what each and every student is thinking. Todd (1999b) suggests that "most approaches to eliciting and acquiring the private, subject knowledge of an individual focus on

verbalization, either written or spoken. Taking a cognitive perspective assumes a strong relation between cognition and discourse, where discourse functions as a lens through which changes to current cognitive states can be observed and measured" (p. 12).

Broadening perspective.

Physically visualizing one's thoughts may be considered one of the most important benefits of using new media in the classroom in support of the influence their classmates' perceptions have in their own learning. Students and teachers in the study extolled the merits of having their classmates' work available to them so that they could use it to add to their own tacit knowledge by seeing others perspectives that agreed with or contradicted their own, or simply to give them ideas to jumpstart their own thinking. Students can "see" others ideas, insights, points of view, opinions, thoughts, original content, and analysis. Findings by a study of using a *Ning* social network confirm the students' and teachers' assertions, suggesting

> [t]he connections students made emphasized connectivism, where interactions that were generated by these connections, whether informal or formal, allowed students to behave in different ways and learn from one another rather than just from the teacher. As a result, opportunities to present new and emergent knowledge continued to develop which helped to enhance the teaching and learning process. (Casey & Evans, 2011, p. 8).

Developing 21st Century Skills

Findings also suggest that new media support the development of the types of skills that are valued in the workplace, commonly referred to in educational literature as 21st century skills. The study found evidence suggesting that specific new media tools can support competencies located within the cognitive domain—specifically information use, critical thinking, and creative expression. The study also found support for ways that new media facilitate competencies located in the interpersonal domain including self-presentation (emerging as the eighth conceptual category), communication and collaboration.

Cognitive domain

The Committee on Defining Deeper Learning and 21st Century Skills identified three broad domains of competence—cognitive, intrapersonal, and interpersonal (National Research Council, 2012, p. 3). The cognitive domain involves reasoning and memory and includes using information from outside sources, critical thinking, and creative expression, which findings from the study suggest are supported by students' use of new media.

Using information from sources.

The ability of students to use information found in multiple information channels by synthesizing it meaningfully into their existing knowledge base and to satisfy the information need remains a goal of high school educators. Information use is a

competency belonging to a larger category of skills most commonly referred to in scholarly and professional literature as "information literacy" (Association of College & Research Libraries, 2014; National Research Council, 2012; Partnership for 21st Century Skills, 2009) or "research and information fluency" (International Society for Technology in Education, 2007).

There are many studies relating to how individuals and groups seek information, but few that address how they use it. Spink & Cole (2006) assert that "the word 'use' is often misconstrued in research on information need and use, [and] it really is a method for asking about the user's use of sources of information when what such research is really doing is asking about the user's use of accessing channels of information sources" (p. 28). Information sources are referred to as information channels—conduits of information.

Information use theories can begin to explain how humans use new information gained from others to add to their own knowledge base. Wilson (2000) explains how information use behavior may consist of "mental acts that involve, for example, comparison of new information with existing knowledge" (p. 50). The "impact of the information," Spink & Cole (2006) identify information use behavior as that which "involv[es] incorporating information into an individual's existing knowledge base" (p.25). Taylor (1991) defines information use as "what information does to or for the recipient and for his or her problem or situation" (p. 221). Kuhlthau (2008) suggests that "information behavior can only be understood within the context of how the information

will be used, in other words, the information impact" (p. 68). From the students' perspective, "the primary objective of information seeking is to accomplish the task that initiated the search" (Kulthau, 2008, p. 68).

Information use skills may include "us[ing] information effectively to accomplish a specific purpose" (Association of College & Research Libraries, 2000), "research using evidence" (National Research Council, 2012), "us[ing] strategies to draw conclusions from information and apply knowledge to curricular areas, real-world situations, and further investigations" (American Association of School Librarians, 2007), and "us[ing] information accurately and creatively for the issue or problem at hand" (Partnership for 21st Century Schools, 2009). Spink & Cole (2006) define information use within a problem solving setting as "the incorporation of found information into their pre-existing knowledge base, by thinking, by taking notes, or in some way cognitively processing or acquiring the information" (p. 29).

Interviews, observations, and document examination uncovered evidence suggesting that students determined relevant information, applied information, and summarized and synthesized information. Students used information from outside sources in sophisticated ways in their *Twitter* posts for the Latin II Roman emperor project. By examining students' notes I found that they used appropriate information channels to locate information including books; the school library's online databases Gale *Student Resources in Context*, ABC-CLIO *World History Ancient & Medieval Eras*, and *Britannica School*; authoritative and accurate websites, and *Wikipedia*. Students had

to determine which facts were relevant to their emperor's life as required by the assignment, take notes, and then creatively condense the information and apply it into short segments posted from the emperor's point of view. The restriction of *Twitter* posts to 140 characters required that students summarize and condense the most important information from their notes. Overall, students felt that the reduction exercise was challenging but beneficial to them in the long run. Students and the teacher all agreed that the assignment and ways that they used information could not have been accomplished without using *Twitter*.

With the exception of the students using information from outside sources in *Twitter* posts for the Roman emperor assignment, other uses of information provided limited support for new media. While pairs of students recorded notes into *Google Docs* for the History 9 medieval diary project, with the intent of sharing their notes and writing their journal entries together, document and transcript examination provided little evidence that students collaborated on the writing of each entry. Instead, teachers allowed students to divide the task with each writing two of four required diary entries. They could accomplish this by entering their own work into *Google Docs* or in *Microsoft Word*. Even if they relied on their partner's notes, they could have traded printed notes and did not need the new media tool to accomplish individual composition. If teachers would have required a true collaboration in note taking and composing the diary entries, *Google Docs* may have proved to be an invaluable tool for accomplishing that task.

Thinking critically.

Critical thinking is a skill long valued in subject-area curriculum. English classes value the critical essay and literary criticism. Students may produce essays after analyzing events in history classes. Critical thinking calls for learners to engage in sustained reasoning (Commission on Accreditation, 2010, p. 11) by inducing and deducing as appropriate to the situation, in addition to making judgments and decisions by analyzing, synthesizing, evaluating, and organizing evidence, arguments, claims and beliefs and making connections between information and arguments (Partnership for 21st Century Schools, 2009, p. 4). They interpret information and draw conclusions based on the best analysis and reflect critically on learning experiences and processes (Partnership for 21st Century Schools, 2009, p. 4). Learners use systems thinking by analyzing how parts of a whole interact with each other to produce overall outcomes in complex systems (Partnership for 21st Century Schools, 2009, p. 4). Also an information literacy skill, critical thinking includes being critical of information found in sources by evaluating for accuracy, bias, and authority and judging for relevancy (American Association of School Librarians, 2007, p. 4; Commission on Accreditation, 2010, p. 11). The National Council for Excellence in Critical Thinking (1987) concisely defines critical thinking as:

> the intellectually disciplined process of actively and skillfully conceptualizing, applying, analyzing, synthesizing, and/or evaluating information gathered from, or generated by, observation, experience, reflection, reasoning, or communication, as a guide to belief and action. In its exemplary form, it is based on universal intellectual values that transcend subject matter divisions: clarity, accuracy,

precision, consistency, relevance, sound evidence, good reasons, depth, breadth, and fairness.

This study's findings suggest that new media support critical thinking. English 12 teachers integrated the *Tumblr* blog into their curriculum to spur on critical thinking and evidence suggests that students analyzed information from outside sources to make connections between course content and their own lives and between themes introduced in the course. Document examination and interview transcripts of students' work using *Twitter* microblog, *PBWorks* wiki, and *Google Docs* shared documents also provides evidence of analysis, evaluation, reflection, comparison, and making connections, all components of critical thinking.

Exercising creativity.

With the emphasis on accountability, the push for students to perform well on standardized tests, including Advanced Placement, often take precedent over creativity in the prescribed curriculum. An exception is in the visual and performing arts where it is expected that students will express their creativity. An examine of curriculum documents at Independent High School, Texas Education Agency, and the Common Core State Standards, finds the word "create" is often used erroneously in place of "build" or "develop"—not in the true sense of creativity.

The Partnership for 21st Century Skills (2009) calls for learners to think creatively by "using a wide range of idea creation techniques (such as brainstorming), create new and worthwhile ideas (both incremental and radical concepts), and elaborate, refine,

analyze and evaluate their own ideas in order to improve and maximize creative efforts" (p. 3). Students who demonstrate creative thinking "apply existing knowledge to generate new ideas, products, or processes, [and] create original works as a means of personal or group expression" (International Society for Technology in Education, 2007, p. 4). A creative mind "produce[s] work that is both novel (original, unexpected) and appropriate (useful, adaptive concerning task constraints)" (Jahnke, 2011, p. 95). While "creativity is subjective—every person has a unique perspective on what a creative effort means"—Jahnke (2011) asserts that the challenge is to "define creativity in a specific context" [such as schools] (p. 100).

Interviews and document examination uncovered evidence suggesting that new media can support creative expression. An examination of each assignment suggests that the creativity demonstrated by students may have resulted from the requirements of the assignment, but that the new media tools employed in each case were critical to the ensuing creativity. While the Latin II teacher expressed that "giving personalities to the emperors added a level of creativity and merriment to the task," twenty percent of the grade depended on the student developing the emperor's personality as stated in the grading rubric given to students. *Twitter,* however, was crucial in its support of the creativity that students demonstrated when they developed personalities for their emperors and additional characters and by the emotion expressed through use of unique hashtags. Students suggested that because their emperor was "talking" through *Twitter*

posts to other emperors, that they put more creativity into their efforts than if required to write a traditional research paper.

In AP Art History, students created their own art history cartoons by adapting an original work of art, which they posted on their individual wiki pages. Even though the cartoons show a great deal of original thought and novel approaches, the wiki was not critical for the creation or storage of the student's work. Subsequently the assignment required students to view a specific number of their classmates' cartoons, which was facilitated by the universal accessibility of the individual student wiki pages. The wiki was not crucial to the assignment, as artwork could have been displayed around the room and the results could have been submitted by hand or a word processed document instead of on the wiki pages. However, Ms. Roberts asserts that the opportunity for students to engage in creative expression would not be possible without using the wiki for student projects as an extension of the classroom, as the content heavy AP curriculum does not allow enough time for creative projects during the 50 minute class periods.

In addition to practicing individual creative processes, the Partnership for 21st Century Skills (2008) stresses that learners work creatively with others. Students who think creatively while collaborating with others

- develop, implement and communicate new ideas to others effectively;
- are open and responsive to new and diverse perspectives;
- incorporate group input and feedback into the work;

- demonstrate originality and inventiveness in work and understand the real world limits to adopting new ideas; and
- view failure as an opportunity to learn; understand that creativity and innovation is a long-term, cyclical process of small successes and frequent mistakes. (p. 3)

Students in the Environmental Science class expressed themselves by collaborating with two partners to produce an original and appropriate public service announcement video addressing environmental issues identified within the school community and made those publicly available via *YouTube*. Students in the Anatomy and Physiology class collaborated on the development of a sports training guide. And students in History 9 collaborated on a Middle Ages project, creatively applying outside information about an aspect of the Middle Ages into original diary entries. Using *Google Docs* to facilitate the collaboration, they effectively communicated new ideas to each other, incorporated group and individual feedback into the work, and demonstrated originality in their results. One ninth grade student described the collaborative process as requiring a "sort of creativity, sort of like a puzzle to be fitting all the work together and to innovate and come up with new things to put things together." Even if students are "thinking creatively while working with others" (Partnership for 21st Century Skills, 2008, p. 3), the new media tools used facilitated the collaborative process, not the creative thought.

Interpersonal Domain

The interpersonal domain involves expressing ideas, and interpreting and responding to messages from others (National Research Council, 2012, p. 3). Students and teachers also suggest that the use of new media tools in the classroom support specific interpersonal skills—self-presentation, collaboration, and communication.

Presenting self.

Included in the findings as a property of the conceptual category Increasing Participation, "Increasing Participation By Motivating Students to Produce Better Work" emerges as a conceptual category, as its dimensions describe it as an interpersonal skill or competency (National Research Council, 2012). "Self-presentation is behavior that attempts to convey some information about oneself, or some image of oneself, to other people" (Baumeister & Hutton, 1987, p. 71). The authors also suggest that "nonparticipation in the classroom can arise from a variety of self-presentational factors, such as reluctance to seem ostentatious about one's knowledge, or even shyness, which can be considered a self-presentational pathology" (p. 74). They further suggest that teachers may want to deal with those students by employing methods to minimize the audience, such as scheduling a one-on-one conference with the student. The study found that new media provided a platform for written participation for students who were reluctant to participate in class discussion, allowing a teacher to assess the student's ability.

The universal accessibility of classmates' academic contributions through new media provides an audience of peers for students. The study found evidence suggesting

that this audience raises a student's level of concern, resulting in presenting an effort to present a positive image of oneself online.

> Students are mostly motivated by "performance goals." Those involve protecting a desired self-image and projecting a positive reputation and public persona. When guided by performance goals, students are concerned with normative standards and try to do what is necessary to demonstrate competence in order to appear intelligent, gain status, and acquire recognition and praise. (Ambrose, Bridges, DiPietro, Lovett, & Norman, 2010, pp. 71-72)

Ambrose, Bridges, DiPietro, Lovett, & Norman (2010) further suggest that goals focused on performance may take two forms: performance-approach goals and performance-avoidance goals. Students with performance-approach goals focus on attaining competence by meeting normative standards, such as the student who doesn't want her classmates to "realize [she is] a moron." Students with performance-avoidance goals on the other hand focus on avoiding incompetence by meeting standards, such as the student in the study who is concerned about how the quality of her work may "affect her partner." The authors suggest that the "cognitive framework with which students approach learning is different from those with an approach versus avoidance orientation, and results of research suggest that performance-approach goals are more advantageous to learning than performance-avoidance goals."

Communicating.

The ability to create a message for a specified audience and choose an appropriate delivery format has always challenged young learners, but takes on an even greater role in the new media ecology.

> A young person who communicates clearly, articulates thoughts and ideas effectively using oral, written and nonverbal communication skills in a variety of forms and contexts, listens effectively to decipher meaning, including knowledge, values, attitudes and intentions, and uses communication for a range of purposes (e.g. to inform, instruct, motivate and persuade). He or she uses multiple media and technologies, and knows how to judge their effectiveness as well as assess their impact, and communicates effectively in diverse environments (including multi-lingual). (Partnership for 21st Century Skills, 2009, p. 4)

Students who participated in the study understood that when they are presenting themselves, they need to convey standard communication skills for others to receive their message. Communicating effectively also requires the ability to identify the audience and choose the best means for delivering information and ideas, sometimes having to "explain and compellingly persuade others of its implication" (Commission on Accreditation, 2010, p. 11).

Students in the study demonstrated effective written communication skills as they collaborated with others using new media and used features available through new media, such as chat, to communicate their ideas with group members. While they extolled the virtues of new media in facilitating group collaboration and communication, they also

expressed value in face to face communication and rejected the idea that new media could replace human interaction.

Collaborating.

Jenkins, Purushotma, Weigel, Clinton, & Robison (2006) discuss the notion that new media tools often have the capacity to simplify some processes, allowing students to focus on deeper learning. Known as "distributed cognition," they explain it as the having the "ability to interact meaningfully with tools that expand our mental capacities." They contest the "traditional view that intelligence is an attribute of individuals," and that "the distributed cognition perspective holds that intelligence is distributed across 'brain, body, and world.'" They go on to suggest that "work in distributed cognition focuses on forms of reasoning that would not be possible without the presence of artifacts or information appliances . . . that expand and augment human's cognitive capacities." They further suggest that distributed cognition is not simply about technologies; it is also about using social institutions and practices or remote experts whose knowledge may be useful in solving a particular problem. The expertise comes in many forms, both human and non-human such as expert practitioners, technologies such as calculators and spreadsheets, and new insights that can come from the teacher or other students. "The key is having expertise somewhere within the distributed learning environment and making sure students understand and deploy it." They propose that when humans understand that keeping track of "key data" using computational processes that they can "thus focus more attention on strategic decision making" and that "the more we rely on the capacities of

technologies as a part of our work, the more it may seem that cognition is distributed" (p. 37.)

> We can understand cognitive activity as shared among a number of people and artifacts, and cognitive acts as learning to think with other people and artifacts. Following this theory, students need to know how to think with and through their tools as much as they need to record information in their heads. (Jenkins, Purushotma, Weigel, Clinton, & Robison, 2006, p. 37)

Technology tools "might be in the form of databases that externalize memory or they can be devices that externalize processes such as calculators or online citation builders" (p. 37). Ambrose, Bridges, DiPietro, Lovett, & Norman (2010) summarize research suggesting that removing "extraneous cognitive load"—those aspects of a task that make it difficult to complete but that are unrelated to what students need to learn—is helpful, especially under some circumstances that call for "instructors to strategically lighten aspects of the task that introduce extraneous cognitive load so that students can focus their cognitive resources on the aspects of a task most germane to the learning objectives" (pp. 106-107). *Google Docs* allows for lightening the extraneous cognitive load by simplifying the organization of group projects by facilitating processes that aid collaboration.

Analysis of the study's findings strongly suggests that a key function of *Google Docs* is the variety of features that facilitate collaborating on group project (such as offering central accessibility to all documents, shared editing, remote access to working

on documents either in real time or asynchronously, the ability to chat online within a document, and the functions that allow members to monitor contributions of individuals within the group). Collaboration occurs when members of a group "participate and interact throughout [a] process to co-produce a finished artifact or product" (Harasim, 2012, p. 72), "produce original works or solve problems" (International Society for Technology in Education, 2007, p. 1), and "exchange ideas with others to develop new understandings [and] make decisions" (American Association of School Librarians, 2007, p. 5). Also referred to as "collective intelligence," collaboration is "the ability to pool knowledge and compare notes with others toward a common goal" and is among the inventory of new media literacies suggested for young people to master for full involvement in the participatory culture (Jenkins, Purushotma, Weigel, Clinton, & Robison, 2006, p. 71). What one doesn't know is probably known or can be taught by another member. If not, the group chooses to locate or create the information or learn the needed skill in order to complete the task or solve the problem. Agarwal (2011) found that students involved in a project can collectively discuss, help each other with questions and exercises and "learn by doing" while maintaining behavioral and cognitive engagement through collective learning (p. 38).

Findings also suggested that *Google Docs* supported the division of labor in group work, aiding students in dividing topics to research, dividing the sources used to locate information, and separating project tasks. Gureckis & Goldstone (2008) found that a group may spontaneously organize into an effective problem solving structure without

the common expectation of centralized control (p. 111). To collaborate effectively, Larusson & Alterman (2009) note that any kind of "organization or community must share information relevant to its purpose" (p. 374).

> There must exist some kind of common understanding about shared activities, roles, and responsibilities, how to proceed in different situations, who will do what, how they will do it, what will be produced, and in what form. During an action, in response to some event, or as part of a planned activity, there are some common expectations about how things will be done. At each moment in time, the participants share some sense of what has happened so far and what will happen next. There will also be different understandings because of division of labor, status, or expertise. Different participants will understand things at different times and in different ways. This is part of the functioning of the community. (Larruson & Alterman, 2009, p. 374)

The study found evidence suggesting that students and teachers can benefit by using the Revision History in *Google Docs* to monitor group member's contributions to collaborative projects and then offering supportive and corrective feedback. Research suggests "that deeper learning requires extensive practice, aided by explanatory feedback that helps learners correct errors and practice correct procedures, that that multimedia learning environments can provide such feedback" (National Research Council, 2012, p. 82).

PRESENTING TWO SUBSTANTIVE THEORIES

The purpose of this study was to explore how new media integration supported formal education and answer the following question:

How can the use of new media in high school curricula support subject-area knowledge building and development of 21st century skills?

To accomplish this, I conducted interviews with teachers who integrated new media in their curricula and the students in their classes, observed students interacting with new media in the course of satisfying assignment requirements, and examined course-related documents. From the findings that emerged from the study I can answer the question simply: New media support knowledge building and 21st century skills development.

Conceptual Model

The constructed grounded theory methods used in this investigation resulted in a model (see Figure 5.1) that shows the relationship among the conceptual categories that emerged from the data. Skills and knowledge building are intertwined, categorized for the purpose of organizing findings. The Committee on Defining Deeper Learning and 21st Century Skills differentiated between cognitive, interpersonal, and intrapersonal domains for the "purpose of understanding and organizing 21st century skills," but "recognize that they are intertwined in human development and learning" and added that "[r]esearch on teaching and learning has begun to illuminate how interpersonal and intrapersonal skills support learning of academic content and how to develop these valuable supporting skills" (National Research Council, 2012, p. 22). It demonstrates the relationship of the

seemingly disparate conceptual categories “increasing participation” and “broadening perspective” to explicit and tacit knowledge building, and the intersection of cognitive and interpersonal skills development in support of knowledge building.

In other words, increased participation, enabled by the use of new media tools, broadened the perspectives of students by allowing them to learn from others as well as from outside information sources. The double-headed arrow between “increasing participation” and “broadening perspective” (see Figure 5.2) indicates that a broadened perspective can lead to increased participation when a student gets ideas from classmates to jumpstart his or her own thinking, uses classmates’ contributions to determine a direction for completing an assignment, or simply to understand that there is more than one “right answer” that may be accepted by the teacher.

Indicated by the large horizontal double-headed arrow in Figure 5.1, as students participate in subject-area assignments and gain perspective from outside sources including classmates, they may be practicing one or more cognitive or interpersonal skills. Integral to knowledge building, students may be thinking critically, exercising creativity, using information, presenting self, communicating, or collaborating, or a combination thereof (see Table 5.1).

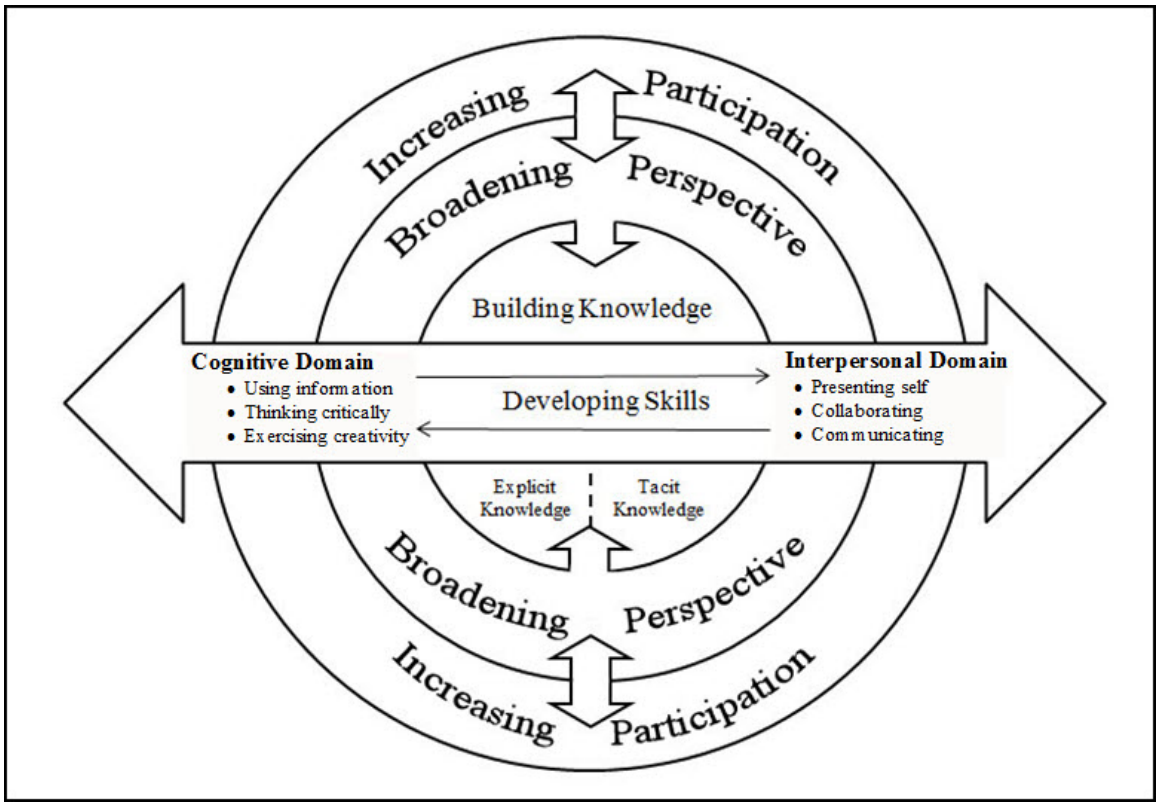


Figure 5.1: Relationships among conceptual categories

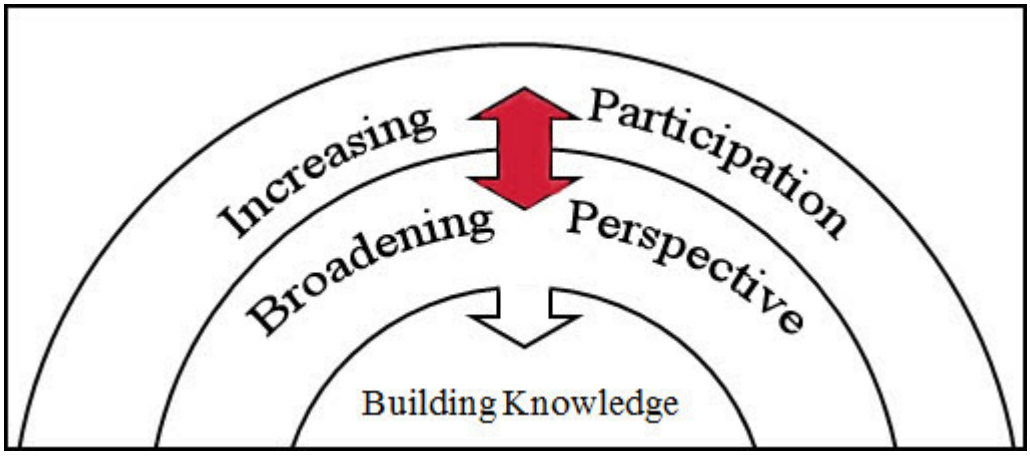


Figure 5.2: Shaded arrow indicates the nonlinear relationship between conceptual categories "increasing participation" and "broadening perspective"

Pervasiveness of Conceptual Categories in All Subjects Examined

Does the integration of new media in the curriculum increase participation and broaden perspective in each subject-area assignment in which it was examined? Findings suggest that it does. Do students practice all of the cognitive and interpersonal skills identified in the findings in each of the subject-area assignments examined? The study found no evidence of collaboration in the use of a class wiki in AP Art History, blogging in English 12, or in the use of *Twitter* in Latin II. While implied, there was no concrete evidence of self-presentation in the use of *Google Docs* in Environmental Science or communication in that particular use of *Twitter* (students role played and interacted with other historical characters). With only a few exceptions, findings suggest that students do practice a variety of 21st century skills as they engage in knowledge building. Table 5.1

summarizes the evidence found in the study that suggests whether or not students practiced cognitive and interpersonal skills throughout the content areas examined.

	AP Art History	Anatomy & Physiology	English 12	Environmental Science	History 9	Latin II
Using information	✓	✓	✓	✓	✓	✓
Thinking critically	✓	✓	✓	✓	✓	✓
Exercising creativity	✓	✓	X	✓	✓	✓
Presenting self	✓	✓	✓	X	✓	✓
Collaborating	X	✓	X	✓	✓	X
Communicating	✓	✓	✓	✓	✓	X

Table 5.1: Findings in specific subject-area content in which students practiced cognitive and interpersonal skills

Substantive Theories Emerge

Charmaz (2006) allows for constructing two or more theories that begin with the same data. The findings from this study support two substantive theories: 1) The use of new media support knowledge building and skills development through increased participation, leading to broadening students' perspectives about subject-area content, and 2) as students engage in knowledge building activities, specific features of new media support the development of specific 21st century skills within the cognitive and interpersonal domains. Two theories are warranted because the first theory (increased participation leading to broadened perspective in subject-area content) is pervasive through all of the subjects and new media examined. The second theory (skills

development) is dependent on the features of new media employed and the skills that are built into an assignment or project and not all skills are evident in each subject-area and new media studied.

EVALUATING A CONSTRUCTIVIST GROUNDED THEORY

A researcher must take into account the criteria for which others may evaluate the process and results of a qualitative study. Credibility, reflexivity, member checking, privacy and confidentiality of participants, privacy of data, and recognition of limitations help to ensure the trustworthiness of the process and results.

Credibility

Charmaz (2006) offers specific criteria to judge the credibility of a study (p. 182). Achieving an "intimate familiarity with the topic" began with 23 years' experience as a school librarian, serving 14 of those in a high school. My role as school librarian had me collaborating with teachers to help students integrate print and digital resources and new media tools into their subject-area content and teach information literacy skills at point of need. I had experience in using blogs, wikis, and shared documents with teachers and students. I had previous experience using grounded theory methods of interviewing, observing, and examining documents.

The data are "sufficient in range, number, and depth of observations" to merit the claims I made. I triangulated data collection by analyzing data from multiple sources: forty interviews; classroom observations; lesson plans; curriculum maps and documents; grading rubrics; individual student notes; shared documents containing notes, schedules, project plans; completed assignments which included diaries, videos, *Twitter* feeds,

individual student wiki pages, a student-created webpage, and blog entries. The multiple data sources were then compared to define codes and refine the emerging conceptual categories (Charmaz, 2006; Glaser & Strauss, 1967; Strauss & Corbin, 1998).

Reflexivity

Also referred to as the researcher's position, the process of "reflecting critically on the self as researcher" calls for the researcher to explain biases, dispositions, assumptions, worldview, and theoretical orientation regarding the research to be undertaken, so that the reader better understands how the researcher might have arrived at the particular interpretation of the data (Merriam, 2009, p. 219, 229). I began this process in the section on Researcher Sensitivity in chapter one and described the theoretical orientation to the research that I undertook in chapter two.

My role as "participant as observer" (Merriam, 2009, p. 124-125) indicates that my methodological position as a "subjective active participant in data generation *with* participants" (Birk & Mills, 2011, p. 52) allowed me to access and incorporate varied data sources, including interviews, field observations and reflections, and student- and teacher-generated texts to bring a rich analysis of ways new media can support learning in the History 9 classes, the Anatomy and Physiology class, and the Environmental Science class. Students and teachers knew and trusted me. As a complete observer (I did not plan any projects or use of new media with the teachers) in the Latin II class, the Advanced Placement Art History class, and the English 12 class, I interviewed the

teachers of and students enrolled in those classes and examined any documents they generated from the use of new media.

Member Checking

Respondent validation helps to ensure that the data gathered from the semi-structured interviews accurately reflect the participants' perspective (Merriam, 2009, p. 217). The sections of the preliminary and final reports, which summarized data from each participant, were sent to the participants for review, allowing for further input, corrections, and clarification as needed. No students or teachers currently at the school made any modifications to their contributions as interpreted for the findings. Thirteen of the students graduated in May of 2013 and their sections were sent via email, with only four replying. Those four students also stated that they felt that their contributions to the study were interpreted and presented accurately. I showed participating teachers and current students the conceptual categories and explained how those categories emerged from their data and shared the model (see Figure 5.1) that depicts the relationship among the conceptual categories. Participants agreed that the model accurately depicts the relationships.

Privacy and Confidentiality of Participants

To protect the privacy of the participants, I informed them that their participation in the study was entirely voluntary and that they could withdraw from the study at any time. The data collected from the observations, interviews, and course-created documents was kept private and confidential. The data were stripped of all concrete identifiers. For

example, the names of the participants and participating school was never recorded in the written word nor was it used verbally under any circumstance. Instead, I replaced the real names with pseudonyms and referred to the pseudonyms only. Under no circumstance did I disclose the names of the participants to a third party. Therefore, there were no risks in terms of privacy and confidentiality of the research participants. Students and their guardian were sent an IRB consent form via email or in person. In addition, no sensitive or personally identifiable information was gathered in the course of interviewing or observing.

Confidentiality of the Research Data

To protect the confidentiality of the research data, the tape-recordings of the interviews, interview transcripts, and coding sheets for the document analysis were stored in password-protected files on my computer's hard drive and will be discarded after the oral defense. All analyses were performed on this computer as well. Memo writing took place in a password-protected *Evernote* account. All files were backed up to a password-protected *Dropbox* (secure file storage) account on the internet. Any names used are pseudonyms. All files will be destroyed after successful completion of the oral defense. Therefore, no risks are expected in terms of confidentiality of the research data.

Limitations of the Study

Cognitive skills will not emerge from all uses of new media unless the educators have developed assignments that require students to use information from outside

sources, exercise creativity, and think critically. Educators should not think that students will develop all of the skills found in the study simply by integrating new media.

The conceptual categories resulting from the methods used in constructive grounded theory are substantive. They address bounded issues in specific areas, which limits their transferability and practicality outside the area examined. The phenomenon I studied is the distinctive application of specific new media tools in curriculum developed by the teachers of record for each course. Replicating the study by integrating the specific new media tools into the same curriculum in other classrooms and schools is unlikely, as most schools follow state mandated curriculum, or in the case of other independent schools, develop their own. Even replicating the same study in the same school with the same courses and teachers may result in different findings, as students' expectations, learning styles, and involvement may vary from group to group. Trying to generalize the findings to a public school setting may be difficult due to how the larger class sizes and more stringent internet filtering restrictions might affect results.

All researchers hold presumptions that influence to some degree the way they interpret data. For example, I had been integrating new media in formal educational settings since it first became available to me, so I cannot distinguish all that emerged during the study from what may have advanced over my tenure as a school librarian.

Students who volunteered for the study may be those who are more academically motivated, or are those who gravitate toward using new media in ways which others may

not, resulting in the mostly positive findings in support of new media's support of learning.

A limitation of interviewing teenagers includes its heavy reliance on the participants' self-reporting, therefore, the quality of the data gathered from interviews depends on the students' self-reporting skills. Fortunately, this limitation is minimized due to the scant amount of time between the completion of the assignments and projects and the interviews.

I found the lack of time to observe students working on projects during class as a limitation, but teachers noted it as a benefit and relied on the collaborative nature of the media to allow extended class time for students to work on projects from their own homes.

Finally, I cannot ignore the effect that my own association with teachers and students may have had on the people I interviewed, all of whom know me as the school's librarian. I am a colleague to the teachers, so our relationships (some as long as fifteen years) could have influenced their inclination to accept my results as reasonable. To students I am a faculty member who has some authority, so power may have influenced their perspectives and their eagerness to help me construct data through interviews.

Chapter Six: Concluding a Study of New Media in Formal Learning

SUMMARY OF FINDINGS

Research suggests that young people are developing skills, competencies, and learning behaviors within the new media ecology and outside of formal learning spaces (Gee, 2007; Ito et al., 2010; Jenkins, 2006, Jenkins, Clinton, Purushotma, Robison, & Weigel, 2006; Lenhart, Arafeh, Smith, & Macgill, 2008). With society's call for education reform and the suggestion that new media may offer affordances for learning that traditional resources lack, few studies exist that examine how new media may support subject-area knowledge building and 21st century skills development in a formal high school setting. The results imply that the use of new media in subject-area studies support knowledge building while providing opportunities for students to practice cognitive and interpersonal skills.

Findings from this study, while limited in scope and general applicability, suggest that students do learn from their interactions with new media as it is integrated into formal educational settings. The study's findings propose that when high school students' interactions with new media facilitate integration of outside sources and make their classmates' contributions available in a central online location, these interactions support explicit and tacit knowledge building. This occurs by increasing individual participation, which can lead to a broadened perception of subject-area content. Findings also suggest that students practice cognitive and interpersonal skills as they use new media to engage in subject area knowledge building. While the features of new media facilitate learning, however, the study also suggests that the components of the assignment have greater

influence on how students use information, think critically, and exercise creativity. I developed two substantive theories from the findings: 1) The use of new media support knowledge building and skills development through increased participation, leading to broadening students' perspectives about subject-area content, and 2) as students engage in knowledge building activities, specific features of new media support the development of specific 21st century skills within the cognitive and interpersonal domains.

IMPLICATIONS

Although much has been written in the practical and popular literature about new media in the educational setting and how it is being used, relatively little scholarly work has been published about how students learn with new media. While significant studies suggest youth develop skills through interacting with new media in their informal lives, scant evidence exists that suggest students can gain knowledge and develop 21st century skills by using new media tools in their formal educational experiences. Findings suggest that students gain and apply subject-area content through their interactions with new media. Teachers whose curriculum is assessed through standardized testing should feel more confident in incorporating progressive practices into their assignments, as they can result in the added benefit of students learning 21st century skills.

Head & Eisenberg (2010), Gasson & Agosto (2008), and McNaught, Lam, Kwok, & Ho (2011) found that students were unmotivated to use new media in the context of their learning, preferring to use traditional tools that enhance individual productivity but do not support development of social skills such as collaboration and communication.

The study and future research agenda offers insight into effective practices that teachers can incorporate to facilitate knowledge building and skills development in a collaborative environment. Findings suggest that if teachers connect traditional subjects with the new media ecology in innovative and meaningful ways and practice these strategies in the course of day-to-day teaching and learning, students should perceive the use of new media in schools as "traditional" instead of something that is imposed on them for the sake of using the tools. These empirical findings can also help convince school administrators that new media integration support knowledge building and skills development in ways that traditional methods cannot, and should not be unnecessarily blocked through the school's internet filter.

Implications for Practice

The fundamental contribution of grounded theory methods resides in offering a guide to interpretive theoretical practice. "Interpretive theorizing can move beyond individual situations and immediate interactions" (Charmaz, 2006, p. 128-129). Emerging from the findings is a set of guidelines that high school educators might consider as they integrate new media into subject-area curricula. Table 6.1 offers suggestions for ways educators might use specific new media tools to support knowledge building and skills development.

Guidelines for integrating new media in subject-area curricula

1. Use new media, such as a class blog or class wiki as an extension to class discussion to ensure that all students are participating and learning from one another.

Make it a part of the culture in the classroom and something that everybody participates in. Teacher Carlyn Parker notes that new media need to be sort of a required part of the course, where that is the only place that the students could interact and access certain materials, and ideas; it should become a habit. She adds that by the end of the class, there was a shift in comfort level in using the blog, which suggests that it needs to become part of the fabric of the class, at least used consistently and be a tool that is the best for the task or goal.

2. Create assignments around the features and capabilities of a particular tool. Find the right tool for the assignment or tailor the assignment to the features of the tool(s). For example, use *Twitter* when students should role play and interact with other characters. Use *Google Docs* when students should collaborate on all aspects of a project. Use a blog when it is appropriate for individual students to respond to curricular prompts and review their classmates' contributions. Use individual pages on a class wiki for students to show results of an assignment so that their classmates can review each other's work and apply their classmates' work to new knowledge.

3. Instruct students on the features and uses of specific new media and try not to assume that they know how to use new media including the application of specific features. For instance, two students in the study were not aware that two or more group members could edit in real time in *Google Docs* from remote locations.

Be specific about the requirements of an assignment and follow through in monitoring the student progress. Provide rubrics for performance expectations. Tell

students why a particular new media tool is useful for the assignment and make the results and assessment critical to and dependent on using the new media.

Example: A few students involved in the History 9 project had little experience with using *Google Docs*. They separated the four journal entries into two independent products, and individually conducted the research needed to complete their portion of the project. They did not follow the teachers' directions to research together, write the diary entries as if one person was writing, or to intertwine the journal entries if there were two roles to consider—therefore they had no real need to use *Google Docs*. Their teachers did not emphasize the usefulness of *Google Docs* and did not monitor their work closely.

When asked about how he used *Google Docs* to collaborate with his partner, Padman admitted:

> No we took those separate from our own scenario. Like I was writing about masters so I took notes about masters in a *[Microsoft] Word* document. She wrote about how apprentices moved on in society until they became masters and how they moved up from being an apprentice.

4. Use the Revision Feature in *Google Docs* to offer summative and formative assessment on the quality and quantity of individual and group contributions.

5. Develop effective and meaningful assignments that build in the skills you want students to develop, along with the knowledge you want them to gain. New media allow for different types of assignments and results. The assignment, not the new media tool, has a lot to do with the quality and scope of the student's thinking. If a teacher wants

students to go beyond the facts by applying, evaluating, or synthesizing them, then she must build that into the assignment. If he wants students to practice cognitive and interpersonal skills, the assignment should be developed so that students must practice the specific skills in order to show successful results.

When asked if students learn as much in crafting a diary entry while studying an aspect of the Middle Ages as opposed to writing a report, Ms. Kemp explains:

> I think there is definitely value to it because not only do they have to have the background information, they have to then figure out how to say that in a more human way. It's not just, "On X date, the Battle of X happened." They have to actually create context. I think creating that context gives them a better sense of a time period. If they want to be able to talk about what this person was wearing or how they would have come in contact with one another. Because I had kids asking, "Well, would a nobleman come in contact with a monk?" And I would say, "You need to think about the context." Or, "Would a peasant eventually be able to become a bishop?" and the answer is no. So, they were thinking about some of those sort of social interactions and what society would have looked like in order to be able to effectively characterize whoever they had chosen as their speaker in their journal, so that was good.

Critical thinking, creative expression, and use of information were components of the assignment in the Latin II Roman emperor project. Using *Twitter* helped students condense the information and use hashtags while interacting with other characters.

Students in the Anatomy and Physiology class had to synthesize and apply the facts and use of an expert's knowledge to appropriately develop webpages on sports training. Ms. Harper asserts that to get students to write good blog posts in English 12 "it sometimes depended on the quality of the question. You know, everything depends on the quality of the question you ask them or the quality of the post that you ask them to complete."

6. Use new media such as *Google Docs* to lighten the cognitive load of students when they are expected to collaborate in small groups. The time-saving features that allow real time editing, storage of notes and other texts, remote access, chatting with group members, division of labor, and monitoring group member's contributions provide more time for students to collaborate to develop content.

7. Build a requirement into the assignment for students to read and comment on classmates' posts because students may not readily read and comment on their classmates' contributions to a class blog, *Twitter* feed, or wiki unless teacher requires it. Juana states, "We were required to at some points, otherwise I wouldn't have gone out of my way to read them." She further suggests that teachers should "direct [students] with how to react [to] and use others posts, so it isn't just 'Oh, it's nice because we can read all the posts.'" Mandy admits, "Sometimes we will read them in class when we are bored." Findings of the study suggest that there is benefit to reading each other's blog posts, because when students "see the thinking" of their classmates it broadens their perspectives by building tacit knowledge.

8. Allow time during class for students to work together on projects that incorporate new media. While the nature of new media is to allow students to interact and collaborate remotely and extend class time, students place value in face-to-face interactions. Braden talks about appreciating the teachers who emphasize "whole interactions with your classmates." Arianne feels that using new media often "eliminates the discussion part of a project."

9. Protect student privacy. Become knowledgeable about each new media tool's privacy settings. Give only registered users access to a class wiki or blog, especially if students are using their real names. Have students share their *Google Doc* with only the teachers and their partners. If the new media site is open to the public, have students change their names and get the permission of the school's administrator and parents, informing them of your intentions and the academic opportunities that open access will afford.

10. Consider that students appreciate when their teacher makes learning fun. A student makes this assertion, representative of others who commented on the element of fun in well-planned projects incorporating new media:

> You know, it's like I said before, *Twitter's* just kind of more appealing [and] since it is kind of a fun project, people tend to put more work into it because [they think], "Well, it's fun, I should do that." And I think [Mr. Mann] just kind of wanted us to have a fun way to understand Roman history and I think we mostly did come to understand Roman history in the same we would have on a report.

Summary of Guidelines:

1. Use new media, such as a class blog or class wiki as an extension to class discussion.
2. Create assignments around the features and capabilities of a particular tool.
3. Instruct students on the features and uses of specific new media.
4. Use the Revision Feature in *Google Docs* to offer summative and formative assessment.
5. Develop effective and meaningful assignments that build in the skills you want students to develop, along with the knowledge you want them to gain.
6. Use new media such as *Google Docs* to lighten the cognitive load of students when they are expected to collaborate in small groups.
7. Build into the assignment a requirement for students to read and comment on classmates' posts.
8. Allow time during class for students to work together on projects that incorporate new media.
9. Protect student privacy. Become knowledgeable about each new media tool's privacy settings.
10. Consider that students appreciate when their teacher makes learning fun.

New media tool	Suggested uses suggested from findings
Google Docs (shared documents)	Use to facilitate collaboration on group projects. Extend cognitive processes by using shared documents to take notes, divide tasks, plan the project, make a timeline or schedule for project completion, edit the document in real time or asynchronously, monitor individual and group progress and content, view partners' contributions and use accordingly. Externalize memory by storing notes and other project documents. Facilitate communication by using the chat feature in real time or the comment feature in real time or asynchronously.
PBWorks (wikis)	Create individual student pages on a class wiki. Use the pages to post results of assignments. Have students look at each of their classmates' contributions—even across sections of the same course—and choose one or more of the postings to apply to content learned in the course. Use the wiki for a central location for students to complete extended projects that cannot be completed in class.
Twitter (microblog)	Use *Twitter* for role playing historical characters. Students can research a character and apply the facts of the character's life in succinct and creative ways. Use hashtags to convey emotion. Develop supporting characters for the assigned one. Interact with other characters from around the same time period and post authentic tweets (140 character posts) to compare or contrast the characters.
Tumblr (blog)	Create a class blog, giving all students author privileges so they can contribute full length posts. Have students post responses to central questions about content studied, discussed, or read for class assignments. Use the blog to have students post what they are thinking at the time so the topic is fresh when class resumes (especially if the class will not meet for an extended period of time). Have students bring in outside links, readings, other media, images and analyze them to make connections to the topics they are studying in class and their own lives. Require students to read their classmates' contributions and make comments as appropriate.

Table 6.1: Suggestions for uses of specific new media as discovered in the study's findings

OPPORTUNITIES FOR FURTHER RESEARCH

The study of how new media support subject-area knowledge building and 21st century skills development is replete with opportunities for further research. Further studies that examine how the use of blogs, microblogs, wikis, and shared documents in formal educational settings, including both public and independent high schools, may help to further develop the conceptual categories that emerged in this study, as well as to add possible new categories and to continue to build on and refine the substantive theory supported by this study. For example, How does the increased participation among students who have diagnosed social disorders/challenges affect their subsequent interactions in class discussions? How does the increased participation among students who have diagnosed social disorders/challenges affect their teacher's perceptions and subsequent assessment of the student's knowledge building? To what extent does the opportunity for students to think about and refine responses to curricular prompts before posting their contributions for their classmates to review increase the quality of their work (self-presentation) compared to the response they would give if it were only for the eyes of the teacher?

A researcher may wish to explore other new media tools, such as *Facebook* (a popular social media site) or *Instagram* (an online photo-sharing, video-sharing and social networking service popular with teens), to determine if the conceptual categories that emerged from the findings in this study are unique to the new media examined in the study or if they transect other types of new media used in learning subject area content. Indeed, other areas of support may emerge from new data.

This topic lends itself to a long-term study that examines how teachers and students' interactions with new media and their classmates evolve over the duration of an academic course. Researchers can identify the quality of student contributions from the beginning of an academic course to those contributed toward the end. A mixed methods study might offer insights into the gains made by one section of a course whose students interacted through new media, compared to another section of the course whose teacher used traditional methods of transferring knowledge to and assessing individual students.

Research is lacking on how to help learners transfer competencies learned in one discipline or topic area outside the discipline or topic area (National Research Council, 2012, p. 7) Do the transferable (21st century) skills students acquire actually transfer to new learning in other disciplines? Findings from a series of studies about the transferability of skills can support the National Educational Technology Plan (2010), which calls for 21st century competencies to be woven into all content areas and further pedagogy reform.

I found limited evidence suggesting that students use new media in support of information seeking, therefore I did not include it in the findings. The assumption is that new media sources are replete with information that students could use to satisfy the information needs of an assignment, but there is limited empirical evidence suggesting that they do (Head & Eisenberg, 2009; Purcell et al., 2012). How can students use new media sites to locate and acquire information for a curricular need? Additionally, research on the content of new media in terms of political, social, and cultural biases will inform

the information literacy curriculum and help teachers and school librarians make wise choices about how to teach students to evaluate new media sources.

Anecdotal observations suggest that when teachers and school librarians collaborate to plan, teach, and assess a content-based project that integrates new media, students achieve a higher level of success due to exposure to the unique expertise of both educators and having two experts from which to seek help. Researchers can study the effects of teacher/librarian collaboration on student results to promote a team approach to planning, teaching, and assessment.

Ultimately, a long-term research agenda that builds on the current study can further explore associations between the use of new media and the potential to increase students' participation and broaden their perspectives and how those two concepts interact with each other to aid in both explicit and tacit subject-area knowledge building. The study found evidence suggesting that students are developing cognitive and interpersonal skills as they engage with new media in formal educational settings, but which intrapersonal skills might students develop and how do they also contribute to knowledge building? How can educators work together to design curriculum that will foster the development of additional skills in all domains? Additionally, I want to explore whether or not the cognitive and interpersonal skills that emerged from the data are unique to the specific new media examined here or do they transect across other forms of new media.

The diagram in Figure 6.1 proposes an overarching conceptual framework for my further research interests.

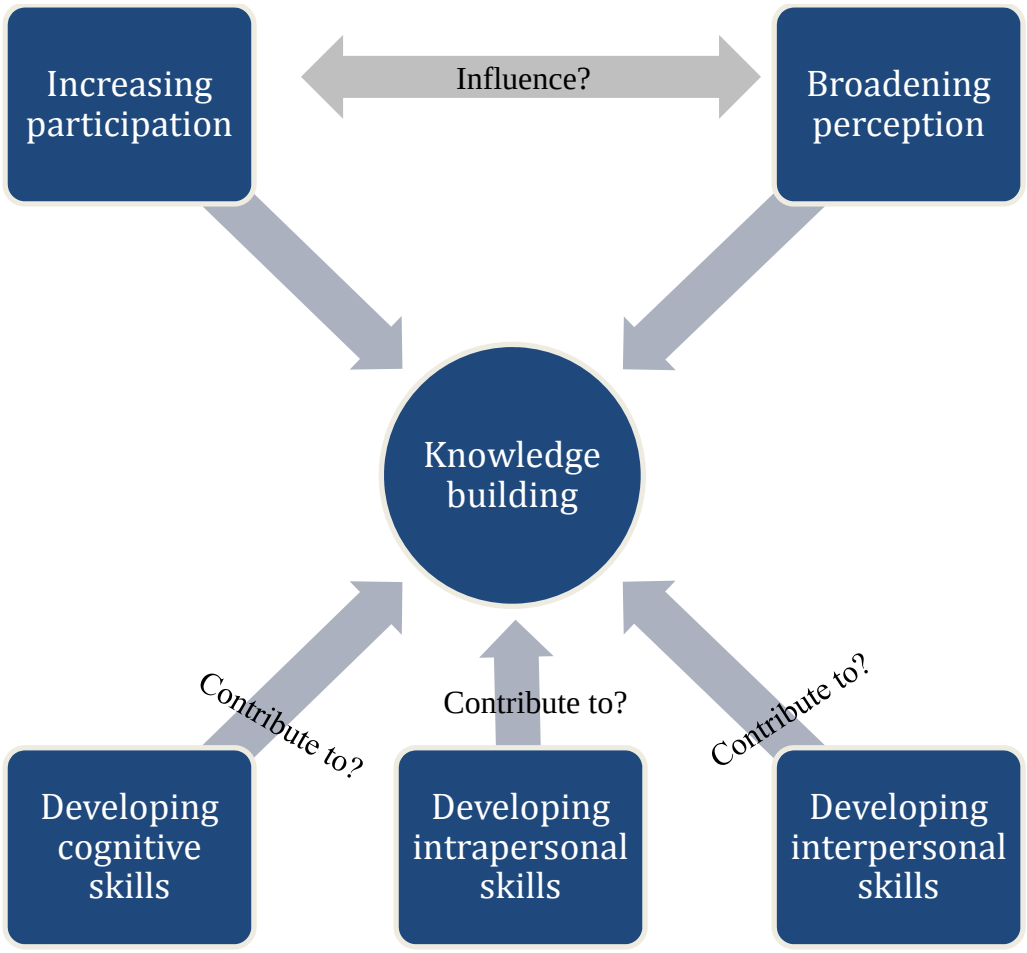


Figure 6.1: Framework for researcher's further interests on building on the findings of the study

Going beyond the immediate classroom, a broader research agenda on a national scale exploring how integration of new media can support subject-area learning can

provide empirical evidence that may affect school funding and spur education reform. This type of widespread study has implications for closing the participation gap between poor and affluent schools, and providing opportunities for all students to engage in the technologies that help build knowledge and develop critical competencies.

With forty-four states, the District of Columbia, four territories, and the Department of Defense Education Activity having adopted the Common Core State Standards (National Governors Association & Council of Chief State School Officers, 2014), research-based methodologies can provide teachers with a set of best teaching practices to help overcome the controversy that ties teacher evaluation to student test scores. Dr. Louisa Motes, one of the writers of the standards, said in a recent interview:

> Our CCSS guidelines, conferences, publishers' materials and books have turned away from critical, research-based methodologies on how to develop the basic underlying skills of literacy. . . . I'm listening, but I don't hear the words "research based" as often as I did a decade ago—and when CCSS proponents use the words, they're usually referring to the research showing that high school kids who can't read complex text don't do as well in college. Basic findings of reading and literacy research, information about individual differences in reading and language ability, and explicit teaching procedures are really being lost in this shuffle. (Bertin, 2014).

A possible research agenda supporting teachers in their efforts to teach the Common Core State Standards can explore: How can students' interaction with new

media support the shift in language arts standards to "building knowledge through content-rich nonfiction" across subject areas in secondary school classrooms, practicing reading, writing, and speaking that is "grounded in evidence from texts, both literary and informational"? How can interaction with new media support the shift in mathematics to "linking topics and thinking across grades" and "pursue conceptual understanding, procedural skills and fluency, and application with equal intensity**"**? Educational organizations offer teaching strategies for the Common Core State Standards that often incorporate new media tools to help students build content and practice the higher level thinking skills promoted in the new standards (The George Lucas Educational Foundation, 2014; Partnership for 21st Century Skills, 2011). Results from a research agenda exploring the influence of new media on learning can provide research-based strategies for the organizations to promote.

Research is also needed to identify some of the major political interests now and in the future that will either enhance integration of new media in the curriculum as described in this study or oppose their use. What are the inherent value and belief systems that can be expected to be used to either justify or oppose the new media as tools for progressive education strongly suggested by these findings?

CONCLUSION

With the infusion of research suggesting that young people develop higher-level competencies through their informal participation in the new media ecology, research is slow to show how that participation and skills development can transfer to and support

formal educational experiences. Education reformers call for pedagogy to shift from a student who consumes the bounded knowledge transferred by a teacher and textbook to one who collaborates with others to critically analyze and use information from a variety of sources to solve authentic problems and create knowledge. However, typical classrooms and curricula continue to privilege explicit knowledge building by individuals, the kind identified by content that is easily articulated, transferred, and assessed. This study shows that new media can help bridge the gap between a student-centered collaborative classroom wherein the teacher facilitates a curriculum that privileges collective knowledge building through the practice of 21st century skills, and a traditional curriculum that privileges individual mastery of content and subject-specific skills. When teachers develop assignments that integrate outside sources, critical thinking, and creative expression with subject-area content, and have students use new media to connect them to the contributions of their classmates and facilitate the processes of collaboration, findings of this study suggest that the new media support explicit and tacit subject-area knowledge building and the development of 21st century cognitive and interpersonal skills. Teachers who participated in the study valued the benefits of new media. It erased the boundaries of the classroom by extending class discussion through the written word and by encouraging all students to participate, therefore learning from one another instead of just the teacher, and by providing time and space to have students study content of interest in more depth by engaging in lengthier projects. Students expressed that by using new media to acquire and analyze outside sources, they made

stronger connections between the themes within subject-area topics and their own lives. They also broadened their own perspectives about subject-area content by having central access to their classmates' opinions, ideas, and interpretations of curricular prompts. Concepts and the substantive theories that emerged from the data can provide a common language educators can use to advocate for the unhindered access to new media in their classrooms and libraries and articulate to their students the benefits they can expect from their engagement with new media in subject-area learning.

Finally, the findings of the study are not an end in themselves; rather, the study proposes a number of areas for further investigation and a future research agenda on a local and national level that addresses political and social adaptation of new media. For schools wanting to endorse a student-centered learning environment, empirical evidence can suggest best practices for shifting pedagogy from teaching to learning, with new media serving as an important element in the support of knowledge building and 21st century skills development. Schools that offer a more traditional approach to education, like Independent High School, but who have teachers who wish to integrate new media tools in specific projects, can incorporate the results of a research agenda that provides specific teaching strategies for using new media to support knowledge building and skills development in traditional subject areas, as the findings from this research suggest.

Appendix A

Ancient Greek Museum Proposal Assignment

The Austin Child Museum won a grant from the federal Institute of Museum and Library Services agency to create interactive exhibits for pre-literate children. Your group will create a proposal for a children's museum exhibit based on a self-selected topic from our Greek studies. Your group will propose an exhibit to the Board of Directors for Austin Children's Museum to try to win part of the grant funding. Remember, the exhibits are for pre-literate, (i.e. preschool) kids. No words, all displays are visual and kinesthetic.

Museum Board's objective: *Deepening the understanding of ancient cultures for young children.*

> Define why the exhibit accomplishes that goal.
>
> Exhibits must go deeper into a topic that was studied in class or you may choose a new topic. You may not simply rehash something we have studied.
>
> How will children learn about the Greek topic?
>
> How will the exhibit be interactive?
>
> Why is this relevant to the museum's objectives, what are they trying to make the museum visitors understand?

You are not developing a complete museum exhibit—you are proposing an exhibit in order to win funding. Your group will choose the presentation method for the proposal to the Board of Directors.

Your classmates will act as the Board of Directors and match your group's presentation to the proposal Topic selection, audience, learning objectives, interactive components, visuals, and exhibit as detailed on the rubric. The "Board" will add constructive comments, then choose all of the exhibits that meet the Museum's **objectives and can be constructed within the means of the museum**. Your teachers will also evaluate your presentation adding the last two categories on the rubric.

Your group will use GoogleDocs to plan the exhibit, store the images you will use, and cite your sources for each image. Your teacher and Ms. Jansen will be added as writers to the GoogleDoc in class.

Rubric:

	Meets criteria	Does not meet criteria
Topic selection	Topic goes into more depth than studied in class, or it is a new topic.	Topic simply rehashes content studied in class.
Audience	Concepts, information, visuals, interactive components, and other materials are developmentally appropriate for preschool children.	Concepts, information, visuals, interactive components, and other materials are too advanced for preschool children.
Learning objectives	Stated learning objectives for audience clear, developmentally appropriate, and attainable.	No stated learning objectives for audience. Or learning objectives unclear, developmentally inappropriate, or unattainable.
Interactive components	Level of interactivity appropriate, safe, and engaging for young children.	No interactivity or level of interactivity inappropriate, unsafe, and or unengaging for young children.
Visuals	Visuals appropriate for audience. Visuals support and extend the topic.	Visuals not appropriate for audience. Visuals do not extend or support the topic.
Exhibit	Exhibit supports the learning objectives and follows a logical progression. The exhibit accomplishes the museum Board's objective.	Exhibit does not support the learning objectives and has no logic to its order. The exhibit does not accomplish the museum Board's objective.
Group planning	Used GoogleDocs for planning. Equal participation and contributions among group members. All image sources cited on planning document.	Used GoogleDocs for planning. Unequal participation and contributions among group members. Some image sources not cited on planning document.
Presentation of proposal	Proposal presentation met guidelines	Proposal presentation did not meet guidelines

Appendix B

IRB USE ONLY
Study Number: 2013-02-0050
Approval Date: 3-19-13
Expires: 3-18-2016

Consent for Participation in Research

Title: "New Media's Support of Knowledge Building and Skills Development in High School Curricula"

Introduction

The purpose of this form is to provide you information that may affect your decision as to whether or not to participate in this research study. The person performing the research will answer any of your questions. Read the information below and ask any questions you might have before deciding whether or not to take part. If you decide to be involved in this study, this form will be used to record your consent.

Purpose of the Study

You have been asked to participate in a research study about the extent to which the use of new media, such as blogs, wikis, etc., in high school courses supports subject-area knowledge building and skills development.

What will you to be asked to do?

If you agree to participate in this study, you will be asked to

- Allow the researcher (Barbara A. Jansen, Educational Technology Chair and Upper School Librarian at St. Andrew's Episcopal School in Austin, TX, and doctoral student in Information Studies at the University of Texas School of Information) to observe in your classroom students' use of new media tools such as wikis, blogs, social bookmarking, and shared documents in the process of satisfying course-related assignments.
- Participate in one initial interview and possibly one or two shorter follow up interviews. Interview questions will concentrate on the extent to which the use of new media tools in course-related assignments may help support subject-area knowledge building and develop social and technical skills.
- Allow the researcher to examine teacher created course-related documents such as lesson plans and curriculum documents, as well as student created planning sheets, notes, reports, and any online creations related to course assignments.

Total estimated time to participate in the study is ongoing through May 2013 as needed. The initial interview session will last no more than 45 minutes and subsequent interviews should last no more than 30 minutes. Classroom observations will occur no more than four times and last the duration of one class session.

Your participation will be audio recorded.

What are the risks involved in this study?

There should be no greater risk than everyday life.

What are the possible benefits of this study?

You will receive no direct benefit from participating in this study; however, your participation will help add to the knowledge base of the discipline and possibly provide other educators with set of principles of practice to guide educators in the effective and safe use of new media in formal learning settings for bridging the gap between informal and formal learning.

Do you have to participate?

No, your participation is voluntary. You may decide not to participate at all or, if you start the study, you may withdraw at any time. Withdrawal or refusing to participate will not affect your relationship with The University of Texas at Austin (University) in anyway.

If you would like to participate please sign this form and return it to the researcher. You will receive a copy of this form.

Will there be any compensation?

You will receive a $50 gift card to Amazon.com. Awarding of the gift card will occur at the conclusion to the study or no later than May 15, 2013. You will be responsible for any taxes assessed on the compensation.

What are my confidentiality or privacy protections when participating in this research study?

This study is anonymous and your participation in the study is entirely voluntary and you can withdraw from the study at any time. The data collected from the observations, interviews, and course-created documents will be kept private and confidential. The data will be stripped of all concrete identifiers. For example, the names of the participants will never be recorded in the written word nor will they be used verbally under any circumstance. Instead, we will replace the real names with pseudonyms and refer to the pseudonyms only. Under no circumstance will the researchers disclose the names of the participants to a third party. Therefore, no risks are expected in terms of privacy and confidentiality of the research participants. The School's name will also be kept confidential and a pseudonym used in its place.

The data resulting from your participation may be made available to other researchers in the future for research purposes not detailed within this consent form. In these cases, the data will contain no identifying information that could associate you with it, or with your participation in any study.

The records of this study will be stored securely and kept confidential. Authorized persons from The University of Texas at Austin, members of the Institutional Review Board, and

participating teachers from your child's school have the legal right to review your child's research records and will protect the confidentiality of those records to the extent permitted by law. All publications will exclude any information that will make it possible to identify your child as a subject. Throughout the study, the researchers will notify your child of new information that may become available and that might affect yours or your child's decision to remain in the study.

If you choose to participate in this study, you will be audio recorded. Any audio recordings will be stored securely and only the research team will have access to the recordings. Recordings will be kept for one year and then erased. The data resulting from your participation may be used for future research or be made available to other researchers for research purposes not detailed within this consent form.

Whom to contact with questions about the study?

Prior, during or after your participation you can contact the researcher Barbara Jansen at 512-294-5508 or send an email to bajansen@utexas.edu.

This study has been reviewed and approved by The University Institutional Review Board and the study number is 2013-02-0050.

Whom to contact with questions concerning your rights as a research participant?

For questions about your rights or any dissatisfaction with any part of this study, you can contact, anonymously if you wish, the Institutional Review Board by phone at (512) 471-8871 or email at orsc@uts.cc.utexas.edu.

Participation

If you agree to participate please return this form to Barbara Jansen.

Signature

You have been informed about this study's purpose, procedures, possible benefits and risks, and you have received a copy of this form. You have been given the opportunity to ask questions before you sign, and you have been told that you can ask other questions at any time. You voluntarily agree to participate in this study. By signing this form, you are not waiving any of your legal rights.

NOTE: Include the following if recording is optional:

_____ I agree to be **audio** recorded.

_____ I do not want to be **audio** recorded.

_____

Printed Name

_____ _____

Signature Date

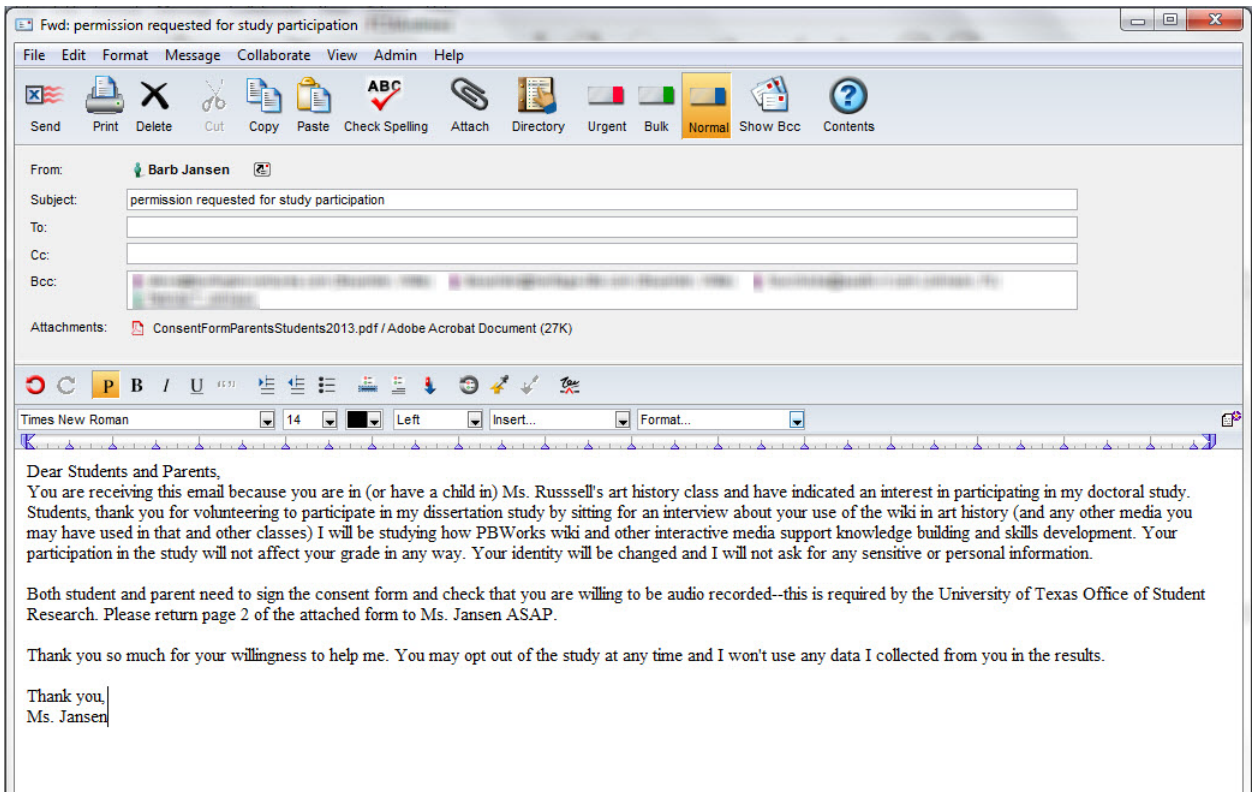
As a representative of this study, I have explained the purpose, procedures, benefits, and the risks involved in this research study.

_____
Print Name of Person obtaining consent

_____ _____
Signature of Person obtaining consent Date

Appendix C

Example of Email Sent to Parents



Appendix D

IRB USE ONLY
Study Number: 2013-02-0050
Approval Date: 3-19-13
Expires: 3-18-2016

CONSENT FORM
"New Media's Support of Knowledge Building and Skills Development in High School Curricula"

You are being asked to allow your child to participate in a research study. This form provides you with information about the study. The persons in charge of this research will also describe this study to you and answer all of your questions. Please read the information below and ask any questions you might have before deciding whether or not to take part. Your participation is entirely voluntary. You can refuse to participate or stop participating at any time without penalty or loss of benefits to which you are otherwise entitled. You can stop your participation at any time and your refusal will not impact current for future relationships with UT Austin or participating sites. To do so simply tell the researcher you wish to stop participation. The researcher will provide you with a copy of this consent for your records.

The purpose of this study is to explore the extent to which the use of new media, such as blogs, wikis, etc., in high school courses supports subject-area knowledge building and skills development.

If you agree to be in this study, we will ask your child to do the following things:

- Allow the researcher (Barbara A. Jansen, Educational Technology Chair and Upper School Librarian at St. Andrew's Episcopal School in Austin, TX, and doctoral student in Information Studies at the University of Texas School of Information) to observe, in the classroom, his or her use of new media tools such as wikis, blogs, social bookmarking, and shared documents in the process of satisfying course-related assignments. The assignments are teacher-directed in the normal course of study, not imposed by the researcher.
- Participate in one initial interview and possibly one or two shorter follow up interviews. Interview questions will concentrate on the extent to which the use of new media tools in course-related assignments may help support subject-area knowledge building and develop social and technical skills.
- Allow the researcher to examine his or her course-related documents such as planning sheets, notes, reports, and online creations related to course assignments.

Total estimated time to participate in the study is ongoing through May 2013 as needed. The initial interview session will last no more than 45 minutes and subsequent interviews should last no more than 30 minutes. Classroom observations will occur no more than four times and last the duration of one class session.

Your child will be audio recorded. The audio recording will be used only for the purpose of obtaining an accurate interview transcription.

Risks of being in the study
There should be no greater risk than everyday life. The students will use privacy settings on new media tools as directed by their teacher and follow their school's acceptable use guidelines. Interview questions will not cover any personal or sensitive topics, concentrating on subject-area knowledge building and social

(such as communication and collaboration) and technical (such as research) skills students may develop as they use the tools in the course of teacher-directed assignments.

Benefits of being in the study will help add to the knowledge base of the discipline and possibly provide educators with set of principles of practice to guide educators in the effective and safe use of new media in formal learning settings for bridging the gap between informal and formal learning.

Compensation: none

Confidentiality and Privacy Protections:
Your child's participation in the study is entirely voluntary and that he or she can withdraw from the study at any time. The data collected from the observations, interviews, and course-created documents will be kept private and confidential. The data will be stripped of all concrete identifiers. For example, the names of the participants will never be recorded in the written word nor will they be used verbally under any circumstance. Instead, we will replace the real names with pseudonyms and refer to the pseudonyms only. Under no circumstance will the researchers disclose the names of the participants to a third party. Therefore, no risks are expected in terms of privacy and confidentiality of the research participants. The School's name will also be kept confidential and a pseudonym used in its place.

The data resulting from your child's participation may be made available to other researchers in the future for research purposes not detailed within this consent form. In these cases, the data will contain no identifying information that could associate your child with it, or with your child's participation in any study.

The records of this study will be stored securely and kept confidential. Authorized persons from The University of Texas at Austin, members of the Institutional Review Board, and participating teachers from your child's school have the legal right to review your child's research records and will protect the confidentiality of those records to the extent permitted by law. All publications will exclude any information that will make it possible to identify your child as a subject. Throughout the study, the researchers will notify your child of new information that may become available and that might affect yours or your child's decision to remain in the study.

If your child chooses to participate in this study, your child will be audio recorded. Any audio recordings will be stored securely and only the research team will have access to the recordings. Recordings will be kept for one year and then erased.

Contacts and Questions:
If you have any questions about the study please ask now. If you have questions later, want additional information, or wish to withdraw your child's participation call the researchers conducting the study. Their names, phone numbers, and e-mail addresses are at the top of this page. If you have questions about your child's rights as a research participant, complaints, concerns, or questions about the research please contact the Office of Research Support at (512) 471-8871 or email: orsc@uts.cc.utexas.edu.

Prior, during or after your participation you can contact the researcher Barbara Jansen at 512-294-5508 or send an email to bajansen@utexas.edu.

This study has been reviewed and approved by The University Institutional Review Board and the study number is 2013-02-0050.

You may keep the copy of this consent form.

You are making a decision about allowing your (son/daughter/child/infant/adolescent youth) to participate in this study. Your signature below indicates that you have read the information provided above and have decided to allow him or her to participate in the study. If you later decide that you wish to withdraw your permission for your (son/daughter/child/infant/adolescent youth) to participate in the study, simply tell me. You may discontinue his or her participation at any time.

_____

Printed Name of (son/daughter/child/infant/adolescent youth)

_____ _____

Signature of Parent(s) or Legal Guardian Date

_____ _____

Signature of Investigator Date

B. Assent form for child between 13 and 17 years of age

"I have read the description of the study titled (give title) that is printed above, and I understand what the procedures are and what will happen to me in the study. I have received permission from my parent(s) to participate in the study, and I agree to participate in it. I know that I can quit the study at any time."

_____ _____

Signature of Child Date

Appendix E

History 9 Scenarios for Diaries of the Middle Ages Project

1. Pilgrimages:

Henry's Miracle of St. Maximinus of Micy

You are an attendant to Lord Henry and accompanied him on his pilgrimage. Your simple peasant life is dramatically changed by the sights, sounds and experiences of this journey. After witnessing this miracle you entered the monastery in Micy and joined the brothers. You have been charged by the abbot with recording the miracle and that work is in the link below. Your task is to recreate the diary your lost describing your experience outside the chapel. Many years later you became the abbot of the monastery and presided over the annual veneration of the miracle of Henry's cure and plan on donating your diary to the monastery.

Glossary: shrine, ritual, patron saint, miracle, laity, relic

http://www.learner.org/interactives/middleages/morelign.html

http://urban.hunter.cuny.edu/~thead/henry.htm

2. One Hundred Years War:

The year is 1356. You are an English longbowman that was a part of the force that has captured the port city of Calais after the relative easy victory over the French at Crecy. You are now moving toward Poitiers to continue the war with France. You will record your personal account of the days leading up to the battle at Poitiers and the battle itself.

Points to consider

- Memories of the Battle of Crecy including results
- Equipment used
- Environment encountered
- Conditions you have encountered since the Battle Of Crecy (plague; exhaustion, etc.)
- Lead up to Poitiers
- Results of Poitiers

3. Crusades from Christian, Muslim, Jewish perspectives:

Scenario 1

Time: 1095

Place: Clermont, France

Assignment: you are a Frankish knight and have been called to hear an address from Pope Urban II. Describe what your life has been like and what the Pope asks you to do. Tell about your expectations for the future and how you're going to prepare for the adventure that awaits.

Glossary: indulgences, Truce of God, Peter the Hermit, Hugh of Vermandois, Raymond IVof Saint-Gilles and Adhemar of Le Puy,

Sources: http://www.fordham.edu/halsall/source/urban2-5vers.html

Scenario 2

Time: 1100

Place: Jerusalem

Assignment: You are a Muslim landowner and businessman in Jerusalem. What happens to your property and business after the conquest of Jerusalem by the Crusaders?

Glossary: First Crusade, 1099 siege of Jerusalem, Kingdom of Jerusalem, Crusader States, dimmi status

Sources: Armstrong, Karen, *Jerusalem: One City, Three Faiths*, 1997; Benvenisti, Meron, *City of Stone: The Hidden History of Jerusalem*, trans. by Maxine Kaufman Nunn, 1996; Kennedy, Hugh. *The Prophet and the Age of the Caliphates*. New York: Pearson/Longman, 2004; Peters, F.E., *Jerusalem: The Holy City in the Eyes of Chroniclers, Visitors, Pilgrims, and Prophets from the Days of Abraham to the Beginnings of Modern Times*, 1985.

Fulk of Chartres's "the Siege of Jerusalem"
http://www.fordham.edu/halsall/source/fulk2.asp

Scenario 3

Time: 1100

Place: Jerusalem

Assignment: You are a Jewish landowner and businessman in Jerusalem. What happens to your property and business after the conquest of Jerusalem by the Crusaders?

Glossary: First Crusade, 1099 siege of Jerusalem, Kingdom of Jerusalem, Crusader States, dimmi status

Sources: Armstrong, Karen, *Jerusalem: One City, Three Faiths*, 1997; Benvenisti, Meron, *City of Stone: The Hidden History of Jerusalem*, trans. by Maxine Kaufman Nunn, 1996; Kennedy, Hugh. *The Prophet and the Age of the Caliphates*. New York: Pearson/Longman, 2004; Peters, F.E., *Jerusalem: The Holy City in the Eyes of Chroniclers, Visitors, Pilgrims, and Prophets from the Days of Abraham to the Beginnings of Modern Times*, 1985.

Fulk of Chartres's "the Siege of Jerusalem"
http://www.fordham.edu/halsall/source/fulk2.asp

4. Norman Conquest:

Time: 1066

Place: Saint-Valery-sur-Somme, France

Assignment: You are a soldier in William the Bastard's army on the eve of the Norman invasion of England in 1066. Describe: the army; the crossing; the Battle of Hastings and the subsequent campaigns as you move north; the English countryside; English politics.

Glossary: Harold II, William the Bastard, The Battle of Hastings, Domesday Book, Rollo, the Normans, Duchy of Normandy, 11th Century France, Harald III, English Channel

Sources: Bayeux Tapestry, William of Malmesbury: "The Battle of Hastings", Internet Medieval Sourcebook, ABC-CLIO

5. Papal power:

When: 1073-1077

Place: Rome and Italy

Assignment: You are Pope Gregory VII between 1073 and 1077 have proposed many changes to your role as pope. You see that the monarchies of Europe are misdirected and lack religious piety. What do you wish to do to change them? How does the role of pope grow and how do you see balance of power shifting? Who are your enemies and why? What do you do to oppose them?

Source: http://ancienthistory.abc-clio.com/Topics/Display/1185712?sid=1444579&useConcept=False

Cowdrey, H. E. John. "Pope Gregory VII and the Bearing of Arms," in *Montjoie: Studies in Crusade History in Honour of Hans Eberhard Mayer*. Edited by Benjamin Z. Kedar, Jonathan Riley-Smith, and Rudolf Hiestand. Aldershot, UK: Ashgate, 1997; Cowdrey, H. E. John. *Pope Gregory VII, 1073–85*. Oxford: Clarendon, 1998; Cowdrey, H. E. John. "Pope Gregory VII's 'Crusading' Plans of 1074," in *Outremer: Studies in the History of the Crusading Kingdom of Jerusalem presented to Joshua Prawer*. Edited by Benjamin Z. Kedar, Hans Eberhard Mayer, and R. C. Smail. Jerusalem: Yad Izhak Ben-Zvi Institute, 1982; Cowdrey, H. E. John. "The Reform Papacy and the Origins of the Crusade," in *Le Concile de Clermont de 1095 et l'Appel à la Croisade*. Rome: Ecole Francaise de Rome, 1997; Erdmann, Carl. *The Origin of the Idea of the Crusade*. Princeton: Princeton University Press, 1977; Robinson, Ian S. "Gregory VII and the Soldiers of Christ." *History* 58 (1973): 169–192.

Glossary: Interdiction, Simony, Indulgences, Excommunication, sacraments, Pope Gregory VII, King Henry IV

6. Viking invasions:

Time: Middle 9th Century

Place: East England

Asssignment: You are an English monk chronicling the Viking Invasions of your country during the middle of the 9th century. Who are these invaders? What do they look like? What do they want? Describe everything.

Glossary: Danelaw, Anglo-Saxon Chronicles, Danes, Longships, Berserkers, Vikings, Scandinavia, Feudalism, Norse

Sources: Anglo-Saxon Chronicles, Norse Epics, Internet Medieval Sourcebook, ABC-CLIO, Frankish Chronicles

7. Feudalism:

Time: Late 11th Century

Place: Normandy, France

Assignment: You are a French lord with vast land holdings. Describe in your journal your manor, the function of peasants, a commendation ceremony, the role of your vassal(s), your relationship with the church, etc.

Glossary: Feudalism, Manorialism, Fief, Lord, Vassal, Commendation Ceremony, Serf, Viking Invasions, Domesday Book, Three Orders, Primogenture, Benefices, Demesne

Sources: Domesday Book, Anglo-Saxon Chronicles, Internet Medieval Sourcebook, ABC-CLIO

8. Trade/Guilds:

The year is 1130 and Theobald II (also known as Theobald IV of Blois) has inherited the area of land known as Champagne. You are a member of the dyer's guild from a town in the region of Champagne. Your guild has had discussions with other guilds and the local lord about holding a fair on the outskirts of your town. There have been discussions about how to acquire the land necessary, fees to be paid and collected and the possibility of merchants and craftsman from other regions coming to the fair. You will record the events leading up to and including the beginning of the fair.

Identify the following terms: Champagne, merchant guild, craft guild, dyer, Theobald II

Points to consider

- What land can be used for the fair…lords, monastic, church
- Permission to hold the fair
- Outside vendors bring goods that are similar to your local goods to the fair.
- Contracts drawn up
- Products available both locally and from outside

9. Monastic Life:

You are the abbot in the monastery at Cluny. There have been murmurings about the monastic life being disruptive to family ties and of weakening the state due to removing skillful men out of their role in civic affairs. You have been asked by the archbishop on orders from the cardinal to draft a series of letters to secular leaders defending the role of the monastery in society. These letters will be read by your superiors and by high ranking

secular leaders not excluding the possibility of the Holy Father himself or kings across western Europe.

Points to consider

- Monastic jobs and occupations
- Benefits to society outside of the monastery
- Achievements by members of the monastery

Glossary: abbot, Benedictine, refuge, liturgy, Cluniac reform

10. Growth of royal power:

The Constitution of Clarendon has been issued by Henry II. You are a clergyman in church of a parish in southwestern England. A priest has been accused of a major crime and there is a question of whether or not he will be tried in a royal court or the church court. You have heard discussions between royal officials and church officials and you have been privy to letters between interested parties. Describe the situation as it unfolds in a personal diary.

Points to consider:

- Church viewpoints
- Royal viewpoints
- Your own viewpoints, keeping in mind your position but also that it is a personal journal

Glossary: investiture controversy, royal courts, ecclesiastical courts, Thomas Becket, common law, Constitutions of Clarendon

Sources: Constitutions of Clarendon

11. Inquisition:

Time: Early 14th Century

Place: Toulouse, France

Assignment: You are a young Dominican friar tasked with transcribing the minutes of an inquisition of a Cathar conducted by Bernard Gui.

Describe: Ideas (Heresy), Setting, Procedure, Punishment. What is the heretic accused of? What ideas come to light? What is the background of the case? Who asks the questions? What is asked? What is the punishment for heresy?

Glossary: Cathars, Marguerite Porete, Beguines, Papal Inquisition (Medieval Inquisition), Waldensians, Ad extirpanda, Pope Innocent IV, Bernard Gui, Dominicans, Franciscans

Sources: Internet History Sourcebooks at Fordham University (For Trial Records, Proceedings, Etc,), ABC-CLIO, Catholic Encyclopedia, Approved Internet Sources

Appendix F

Initial Codes

a really good study tool
abstract meaning
administrative approval
advantages
aids retention
allow enough time to plan
allow for student feedback
allow kids to use technology
allow students to have a say
allowing free reign
allows for bringing in examples
alternate between f2f and digital tool
alternative ways of thinking
analysis
Anatomy
appearance
application
appropriate use
Art History
ask students' opinions on curriculum
ask teacher
assessment
assignment
availability
be a safe cognitive place for kids
be aware of content vs appearance
be consistent
benefits
books
build community
build on prior knowledge with tech coordinator
build skills, language
Building off of each other
building relationships makes trying new stuff easier
can go back and look at
can’t really look at other peo..
can't have abstract thoughts

cell phone
cell phone update
challenges
check for originality, plagiarism
choose independently
citing sources
class archive
class notes
cognitive growth
collaboration
commenting on others' work
comments not useful for students
communication
compare websites
connecting subject to popular culture
create alternative space
create context
creativity
creativity hard to judge
credibility of sources
critical analysis
critical thinking
data collection
databases
databases filter/narrow
databases not used
databases with big project
depended so much on use of the..
develop assessment
develop creative projects
develop skills, critical analysis
did not find useful
different learning tool than used to
different way of learning
difficult process, needs boost
discovery
distraction
do not like
don't do everything online at first
don't have to be perfect to start
don't have to print to discuss
don't let it get out of hand

don't let kids play with tool
drawback
drawbacks
drawbacks
drawbacks, copy and paste
easier to learn
easy to use
edit posts
editing, need for
efficiency
eliminates the discussion part of a project
emotional response to information
encourage & develop artistic characteristics
encourages participation
engage all students
English12
entertainment
Environmental Science
ethical consideration
everyone participates
everyone sees posts
expect roadbumps
experts
expression
extend classroom time
extra postings
Facebook
face-to-face
face-to-face important in projects
facilitates archive of work
facilitates discussion
facilitates information all in one place
facilitates organization
facilitates planning
facilitates remembering
facilitates saving data
facilitates understanding
facilitates updates
familiarity of social media
feeling
find help if needed
find out instructions

formal vs informal
fostering comraderie
free and you were able to do w..
frequency of citations
fun
get different points of view
give free time to explore
give guiding questions
good study tool
google
google books
google docs
google docs facilitate who does what
google docs facilitates group work
google docs facilitates organization
google docs not used
google docs ways around student edits
google forms
google search strategies
google sites
government websites
grade group work
great thing to use with class
great to see those different w..
group work
hands-on learner
hashtags
help partner
helpful monitoring partner's work
helpful tool
History 9
homework help
immediacy
immediate online sharing
individuality
informal use
informal use of social media
informal writing, smart & thoughtful
instruct on use of sites
integrate into course
intelligences, various kinds of
interact with classmates

interactive
interpretation
introduce new technologies slowly
It sounds more harsh on the in..
it’s a very broad source
It’s just so easy
jump start class conversation
just what we thought in contra..
keep social media that kids use for fun out of the classroom
keep track of progress
keywords
kinds of topics that allow personal thought
know your audience, know the kids
lab reports
Latin
learn with wiki
learn without wiki
learning curve
learning from classmates
larning from classmates
learning from classmates' notes
learning from classmates, not
learning from their opinions
lecture
lecture notes
let it grow
let people be creative
library website
listening to different set of voices
live updates
locating information
look at Wikipedia links
make assignment more engaging
make it meaningful
make participation different than classroom
makes assignments interesting
making connections
making real-world connections
meaningful time filler in class
memes
monitor quality of work
more difficult to do assignment without

more research-based assignments
motivation to work hard for benefit of group
move out of comfort zone
movement
music videos
negative opinion
new ways of figuring out
no informal social media use
no worksheets
nonrequired
not that concerned about
note taking
notes
objectivity
objectivity in Art History vs abstraction
obstacles
octopus thinking
offer format not possible in classroom
online is easily available
open-ended questions
other people could go look at ..
others' perspectives
our own thoughts
participating online
partner
partner: personal evaluation of
permanency of information
personal business
personal expression
personal interests
personal reflection
personal wiki page
pick favorite original cartoon of classmate
picking apart our own brain
pond samples
post links
posting happened naturally
practice
practicing subject-area knowledge
prefer group work to working alone
privacy of students
problem solving

process information
process more important than product
produce better work
enjoyment of making stuff
sharing
promotes informal expression
promotes real-world collaboration
promotes social interaction
prompts
props
provide example or template
PSA
react to reading
read other's posts
really cool way of learning Ar..
really good way to do group pr..
requirement
requires internet
research papers
researching just one thing
rubrics
see how creative other student..
see other's posts
see what they’re thinking
see who accesses own posts
see who did what
setting example for partner
share notes
sharing the work load
sharing with teacher
shift from public to private
short courses useful
simultaneous editing
skype
so much easier with Google Doc..
so not one thing becomes the norm
social skills
sometimes you need to learn ho..
spanish project
standardized tests
start small
storyboard

structure assignment well
student interaction with each other
students comment to make sure they are reading
students contribute content
students learned about each other
students loved it
students who naturally think outside the box
study skills
studying for finals
subject-area content learning
subject-area content learning, not much
subjectivity
take charge
teacher advice
teacher advice: don't use monitoring sofware, trust students
teacher advice: learn tool first
teacher follow up
teacher individuality
teacher use of new media: recording dates
teachers should not be involved in social media
technical how-to
technical skills
tell kids to close other social media
template for storing information
test taking
texting
the goodness of the informatio..
thoughtful response
tool allows for hacking into ongoing discussion
tool is critical to learning
tool is not critical to learning
tool wise
topic choices
transfer into Word
transferable skills
trust
try it
tumblr
tumblr classroom use: capture immediate reaction to revisit later
tumblr classroom use: show images, etc. to discuss
tumblr contributed to close-knit class
twitter

twitter benefits
ues best tool for the job
undoing formal educational training
university websites
use academic sources and wiki in classroom
use databases if required
use frequently
use google docs
use in college
use in other classes
use new media tool only for class
use to initiate or continue conversation
use to organize class assignments and documents
use tools freshman year
use tools freshman year, not since
use Wikipedia for keywords and related words
use Wikipedia for links
use Wikipedia for overview
uses media that feels more current for students
using familiar processes
validity
valuing students' opinions
video or poem reminding of what is read
Vine
voicethread
ways around individual edits
weird for student if using informal social media in class
what the artist was really thi..
what we thought the artist was..
wiki
wiki facilitates learning
wiki facilitating thinking
wiki provides options
Wikiepedia not used for school
Wikiepedia sidebars
Wikipedia
Wikipedia & Google on small project
Wikipedia bothersome
Wikipedia complicated to understand
work remotely
work up to making nm central part of class
working in a group

working with peers
Yahoo Answers
you have already done this
you tube

Appendix G

Focused codes

assessment
assessment: creativity hard to judge
assessment: individuality
assessment: objectivity
assessment: rubrics
assessment: subjectivity
assessment: transferable skills
assessment: validity
assignment
Building off of each other
can't have abstract thoughts
can go back and look at
can’t really look at other peo..
cell phone
cell phone update
challenges
citing sources
cognitive growth
commenting on others' work
comments not useful for students
create context
credibility of sources
credibility of sources: appearance
credibility of sources: experts
credibility of sources: feeling
credibility of sources: frequency of citations
credibility of sources: look at Wikipedia links
credibility: not that concerned about
credibility: Wikipedia bothersome
data collection
depended so much on use of the..
different learning tool than used to
different way of learning
discovery
distraction
don't have to print to discuss
easier to learn
editing, need for
efficiency
eliminates the discussion part of a project
emotional response to information
encourages participation
English12

entertainment
Environmental Science
ethical consideration
expression
face-to-face
Facebook
facilitates archive of work
facilitates discussion
facilitates information all in one place
facilitates organization
facilitates remembering
facilitates saving data
facilitates understanding
facilitates updates
familiarity of social media
find out instructions
formal vs informal
free and you were able to do w..
fun
get different points of view
give guiding questions
good study tool
google docs
google docs facilitate who does what
google docs facilitates group work
google docs facilitates organization
google docs not used
google docs: availability
google docs: benefits
google docs: choose independently
google docs: do not like
google docs: drawbacks
google docs: drawbacks, copy and paste
google docs: facilitates planning
google docs: helpful monitoring partner's work
google docs: live updates
google docs: more difficult to do assignment without
google docs: promotes real-world collaboration
google docs: promotes social interaction
google docs: requires internet
google docs: see who did what
google docs: share notes
google docs: sharing with teacher
google docs: simultaneous editing
google docs: template for storing information
google docs: transfer into Word
google docs: ways around individual edits
google forms
google sites

google sites: easy to use
government websites
grade group work
great thing to use with class
great to see those different w..
group work
group work: advantages
group work: fostering comraderie
group work: motivation to work hard for benefit of group
group work: setting example for partner
group work: take charge
group work: transferable skills
group work: working with peers
hands-on learner
hashtags
help partner
helpful tool
History 9
immediate online sharing
informal use
informal use of social media
intelligences, various kinds of
interact with classmates
interactive
interpretation
introduce new technologies slowly
It sounds more harsh on the in..
it's a very broad source
It's just so easy
just what we thought in contra..
keep social media that kids use for fun out of the classroom
keywords
kinds of topics that allow personal thought
lab reports
Latin
learn with wiki
learn without wiki
learning curve
learning from classmates
learning from classmates' notes
learning from classmates, not
learning from their opinions
lecture
listening to different set of voices
locate sources: ask teacher
locate sources: books
locate sources: class notes
locate sources: compare websites
locate sources: databases

locate sources: databases filter/narrow
locate sources: databases not used
locate sources: databases with big project
locate sources: difficult process, needs boost
locate sources: google
locate sources: google books
locate sources: google search strategies
locate sources: library website
locate sources: use databases if required
locate sources: use Wikipedia for keywords and related words
locate sources: use Wikipedia for links
locate sources: use Wikipedia for overview
locate sources: Wikiepedia sidebars
locate sources: Wikipedia
locate sources: Wikipedia & Google on small project
locate sources: Yahoo Answers
locating information
locating sources: class notes
locating sources: tumblr
locating sources: Wikiepedia not used for school
locating sources: Wikipedia complicated to understand
makes assignments interesting
making connections
memes
monitor quality of work
move out of comfort zone
movement
music videos
negative opinion
new ways of figuring out
no informal social media use
no worksheets
nonrequired
objectivity in Art History vs abstraction
obstacles
octopus thinking
online is easily available
open-ended questions
other people could go look at ..
others' perspectives
our own thoughts
partner
partner: personal evaluation of
permanency of information
personal business
personal expression
personal interests
personal wiki page
pick favorite original cartoon of classmate

picking apart our own brain
pond samples
post links
posting happened naturally
practice
prefer group work to working alone
privacy of students
process more important than product
produce better work
production: enjoyment of making stuff
production: sharing
props
PSA
read other's posts
really cool way of learning Ar..
really good way to do group pr..
requirement
research papers
researching just one thing
see how creative other student..
see other's posts
see what they're thinking
see who accesses own posts
sharing the work load
shift from public to private
short courses useful
skype
so much easier with Google Doc..
so not one thing becomes the norm
social skills
sometimes you need to learn ho..
spanish project
standardized tests
storyboard
students who naturally think outside the box
study skills
studying for finals
subject-area content learning
subject-area content learning, not much
teacher advice
teacher advice: administrative approval
teacher advice: allow enough time to plan
teacher advice: allow kids to use technology
teacher advice: allow students to have a say
teacher advice: be a safe cognitive place for kids
teacher advice: be aware of content vs appearance
Teacher advice: be consistent
teacher advice: build on prior knowledge with tech coordinator
teacher advice: building relationships makes trying new stuff easier

teacher advice: check for originality, plagiarism
teacher advice: develop assessment
teacher advice: develop creative projects
teacher advice: don't do everything online at first
teacher advice: don't have to be perfect to start
teacher advice: don't let it get out of hand
teacher advice: don't let kids play with tool
teacher advice: don't use monitoring sofware, trust students
teacher advice: everyone participates
teacher advice: expect roadbumps
teacher advice: face-to-face important in projects
teacher advice: find help if needed
teacher advice: give free time to explore
teacher advice: google docs ways around student edits
Teacher advice: homework help
teacher advice: instruct on use of sites
teacher advice: integrate into course
teacher advice: know your audience, know the kids
teacher advice: learn tool first
Teacher advice: lecture notes
teacher advice: let it grow
teacher advice: let people be creative
teacher advice: make it meaningful
teacher advice: make participation different than classroom
teacher advice: more research-based assignments
teacher advice: provide example or template
teacher advice: start small
teacher advice: structure assignment well
teacher advice: tell kids to close other social media
teacher advice: try it
teacher advice: use frequently
teacher advice: use google docs
teacher advice: work up to making nm central part of class
teacher advice: you have already done this
teacher follow up
teacher individuality
teacher use of new media: recording dates
teacher use: allow for student feedback
teacher use: ask students' opinions on curriculum
teacher use: build skills, language
Teacher use: connecting subject to popular culture
teacher use: create alternative space
teacher use: develop skills, critical analysis
teacher use: encourage & develop artistic characteristics
teacher use: engage all students
teacher use: extend classroom time
teacher use: google
teacher use: jump start class conversation
teacher use: keep track of progress

Teacher use: learning from classmates
teacher use: make assignment more engaging
teacher use: making real-world connections
teacher use: meaningful time filler in class
Teacher use: no monitoring student use on wiki
teacher use: offer format not possible in classroom
Teacher use: practicing subject-area knowledge
teacher use: student interaction with each other
Teacher use: students comment to make sure they are reading
teacher use: students contribute content
Teacher use: technical how-to
teacher use: thoughtful response
teacher use: uses media that feels more current for students
teachers should not be involved in social media
technical skills
test taking
texting
the goodness of the informatio..
tool allows for hacking into ongoing discussion
tool is critical to learning
tool is not critical to learning
tool wise
topic choices
transferable skill: participating online
transferable skills
transferable skills: collaboration
transferable skills: communication
transferable skills: creativity
transferable skills: critical analysis
transferable skills: critical thinking
Transferable skills: note taking
transferable skills: problem solving
transferable skills: process information
transferable skills: working in a group
trust
tumblr
tumblr classroom use: capture immediate reaction to revisit later
tumblr classroom use: show images, etc. to discuss
tumblr contributed to close-knit class
tumblr: allows for bringing in examples
tumblr: alternative ways of thinking
tumblr: build community
tumblr: class archive
tumblr: did not find useful
tumblr: drawbacks
tumblr: edit posts
tumblr: extra postings
tumblr: immediacy
tumblr: informal writing, smart & thoughtful

tumblr: personal reflection
tumblr: promotes informal expression
tumblr: prompts
tumblr: react to reading
tumblr: students learned about each other
tumblr: students loved it
tumblr: use to initiate or continue conversation
twitter
twitter benefits
twitter: drawback
twitter: everyone sees posts
ues best tool for the job
undoing formal educational training
university websites
use academic sources and wiki in classroom
use in college
use in other classes
use new media tool only for class
use tools freshman year
use tools freshman year, not since
using familiar processes
valuing students' opinions
video or poem reminding of what is read
Vine
voicethread
weird for student if using informal social media in class
what the artist was really thi..
what we thought the artist was..
wiki
wiki facilitates learning
wiki facilitating thinking
wiki provides options
wiki: use to organize class assignments and documents
work remotely
you tube

Appendix H

Code Families

HU: DissertationDocuments
File: [C:\Users\bjansen\Documents\Scientific Software\ATLASti\DissertationDocuments.hpr6]
Edited by: Super
Date/Time: 2014-01-24 15:53:02

Code Family: Assessment
Created: 2013-07-23 15:21:47 (Super)
Codes (8): [assessment] [assessment: creativity hard to judge] [assessment: individuality] [assessment: objectivity] [assessment: rubrics] [assessment: subjectivity] [assessment: transferable skills] [assessment: validity]
Quotation(s): 29

Code Family: Credibility of Information
Created: 2013-07-22 12:40:53 (Super)
Codes (3): [credibility: not that concerned about] [credibility: Wikipedia bothersome] [transferable skills: credibility of sources]
Quotation(s): 44

Code Family: Ethical Use
Created: 2013-07-24 13:57:31 (Super)
Codes (2): [privacy of students] [transferable skills: ethical consideration]
Quotation(s): 27

Code Family: GoogleDocs Benefits & Challenges
Created: 2013-07-23 16:30:16 (Super)
Codes (37): [data collection] [good study tool] [*Google Docs*] [*Google Docs* facilitate who does what] [*Google Docs* facilitates group work] [*Google Docs* facilitates organization] [*Google Docs* not used] [*Google Docs*: availability] [*Google Docs*: benefits] [*Google Docs*: choose independently] [*Google Docs*: do not like] [*Google Docs*: drawbacks] [*Google Docs*: drawbacks, copy and paste] [*Google Docs*: facilitates planning] [*Google Docs*: helpful monitoring partner's work] [*Google Docs*: live updates]

[*Google Docs*: more difficult to do assignment without] [*Google Docs*: promotes real-world collaboration] [*Google Docs*: promotes social interaction] [*Google Docs*: requires internet] [*Google Docs*: see who did what] [*Google Docs*: share notes] [*Google Docs*: sharing with teacher] [*Google Docs*: simultaneous editing] [*Google Docs*: template for storing information] [*Google Docs*: transfer into Word] [*Google Docs*: ways around individual edits] [google forms] [google sites] [google sites: easy to use] [lab reports] [sharing the work load] [so much easier with Google Doc..] [storyboard] [study skills] [studying for finals] [work remotely]
Quotation(s): 188

Code Family: Knowledge Building
Created: 2013-07-23 14:59:37 (Super)
Codes (39): [abstract meaning] [aids retention] [allowing free reign] [application] [cognitive growth] [create context] [depended so much on use of the..] [different way of learning] [discovery] [emotional response to information] [entertainment] [expression] [get different points of view] [interpretation] [just what we thought in contra..] [kinds of topics that allow personal thought] [listening to different set of voices] [making connections] [music videos] [new ways of figuring out] [objectivity in Art History vs abstraction] [octopus thinking] [others' perspectives] [our own thoughts] [personal expression] [pick favorite original cartoon of classmate] [picking apart our own brain] [pond samples] [practice] [produce better work] [read other's posts] [see other's posts] [see what they're thinking] [students who naturally think outside the box] [the goodness of the informatio..] [tool is critical to learning] [tool is not critical to learning] [what the artist was really thi..] [what we thought the artist was..]
Quotation(s): 141

Code Family: Learning from Classmates
Created: 2013-07-24 12:57:46 (Super)
Codes (4): [learning from classmates] [learning from classmates' notes] [learning from classmates, not] [learning from their opinions]
Quotation(s): 112

Code Family: Locating Information
Created: 2013-07-24 13:10:00 (Super)
Codes (26): [locate sources: ask teacher] [locate sources: books] [locate sources: class notes] [locate sources: compare websites] [locate sources: databases] [locate sources: databases filter/narrow] [locate sources: databases not used] [locate sources: databases with big project] [locate sources: difficult process, needs boost] [locate sources: google] [locate sources: google books] [locate sources: google search strategies] [locate sources:

library website] [locate sources: use databases if required] [locate sources: use Wikipedia for keywords and related words] [locate sources: use Wikipedia for links] [locate sources: use Wikipedia for overview] [locate sources: Wikiepedia sidebars] [locate sources: Wikipedia] [locate sources: Wikipedia & Google on small project] [locate sources: Yahoo Answers] [locating information] [locating sources: class notes] [locating sources: *Twitter*] [locating sources: Wikiepedia not used for school] [locating sources: Wikipedia complicated to understand]
Quotation(s): 152

Code Family: New Media Benefits
Created: 2013-07-23 17:15:13 (Super)
Codes (20): [don't have to print to discuss] [encourages participation] [facilitates archive of work] [facilitates discussion] [facilitates information all in one place] [facilitates organization] [facilitates remembering] [facilitates saving data] [facilitates understanding] [facilitates updates] [fun] [immediate online sharing] [interact with classmates] [interactive] [online is easily available] [permanency of information] [personal wiki page] [post links] [sharing the work load] [work remotely]
Quotation(s): 99

Code Family: New Media Challenges
Created: 2013-07-23 16:37:48 (Super)
Codes (4): [challenges] [distraction] [eliminates the discussion part of a project] [obstacles]
Quotation(s): 10

Code Family: Teacher Advice
Created: 2013-07-24 13:49:43 (Super)
Codes (44): [teacher advice] [teacher advice: administrative approval] [teacher advice: allow enough time to plan] [teacher advice: allow kids to use technology] [teacher advice: allow students to have a say] [teacher advice: be a safe cognitive place for kids] [teacher advice: be aware of content vs appearance] [Teacher advice: be consistent] [teacher advice: build on prior knowledge with tech coordinator] [teacher advice: building relationships makes trying new stuff easier] [teacher advice: check for originality, plagiarism] [teacher advice: develop assessment] [teacher advice: develop creative projects] [teacher advice: don't do everything online at first] [teacher advice: don't have to be perfect to start] [teacher advice: don't let it get out of hand] [teacher advice: don't let kids play with tool] [teacher advice: don't use monitoring sofware, trust students] [teacher advice: everyone participates] [teacher advice: expect roadbumps] [teacher advice: face-to-face important in projects] [teacher advice: find help if needed]

[teacher advice: give free time to explore] [teacher advice: *Google Docs* ways around student edits] [Teacher advice: homework help] [teacher advice: instruct on use of sites] [teacher advice: integrate into course] [teacher advice: know your audience, know the kids] [teacher advice: learn tool first] [Teacher advice: lecture notes] [teacher advice: let it grow] [teacher advice: let people be creative] [teacher advice: make it meaningful] [teacher advice: make participation different than classroom] [teacher advice: more research-based assignments] [teacher advice: provide example or template] [teacher advice: start small] [teacher advice: structure assignment well] [teacher advice: tell kids to close other social media] [teacher advice: try it] [teacher advice: use frequently] [teacher advice: use *Google Docs*] [teacher advice: work up to making nm central part of class] [teacher advice: you have already done this]
Quotation(s): 81

Code Family: Teacher Use of New Media
Created: 2013-07-24 13:50:25 (Super)
Codes (26): [teacher use of new media: recording dates] [teacher use: allow for student feedback] [teacher use: ask students' opinions on curriculum] [teacher use: build skills, language] [Teacher use: connecting subject to popular culture] [teacher use: create alternative space] [teacher use: develop skills, critical analysis] [teacher use: encourage & develop artistic characteristics] [teacher use: engage all students] [teacher use: extend classroom time] [teacher use: google] [teacher use: jump start class conversation] [teacher use: keep track of progress] [Teacher use: learning from classmates] [teacher use: make assignment more engaging] [teacher use: making real-world connections] [teacher use: meaningful time filler in class] [Teacher use: no monitoring student use on wiki] [teacher use: offer format not possible in classroom] [Teacher use: practicing subject-area knowledge] [teacher use: student interaction with each other] [Teacher use: students comment to make sure they are reading] [teacher use: students contribute content] [Teacher use: technical how-to] [teacher use: thoughtful response] [teacher use: uses media that feels more current for students]
Quotation(s): 49

Code Family: Transferable Skills
Created: 2013-07-22 12:39:32 (Super)
Codes (9): [process more important than product] [transferable skills: collaboration] [transferable skills: communication] [transferable skills: creativity] [transferable skills: critical analysis] [transferable skills: ethical consideration] [transferable skills: problem solving] [transferable skills: process information] [transferable skills: working in a group]
Quotation(s): 134

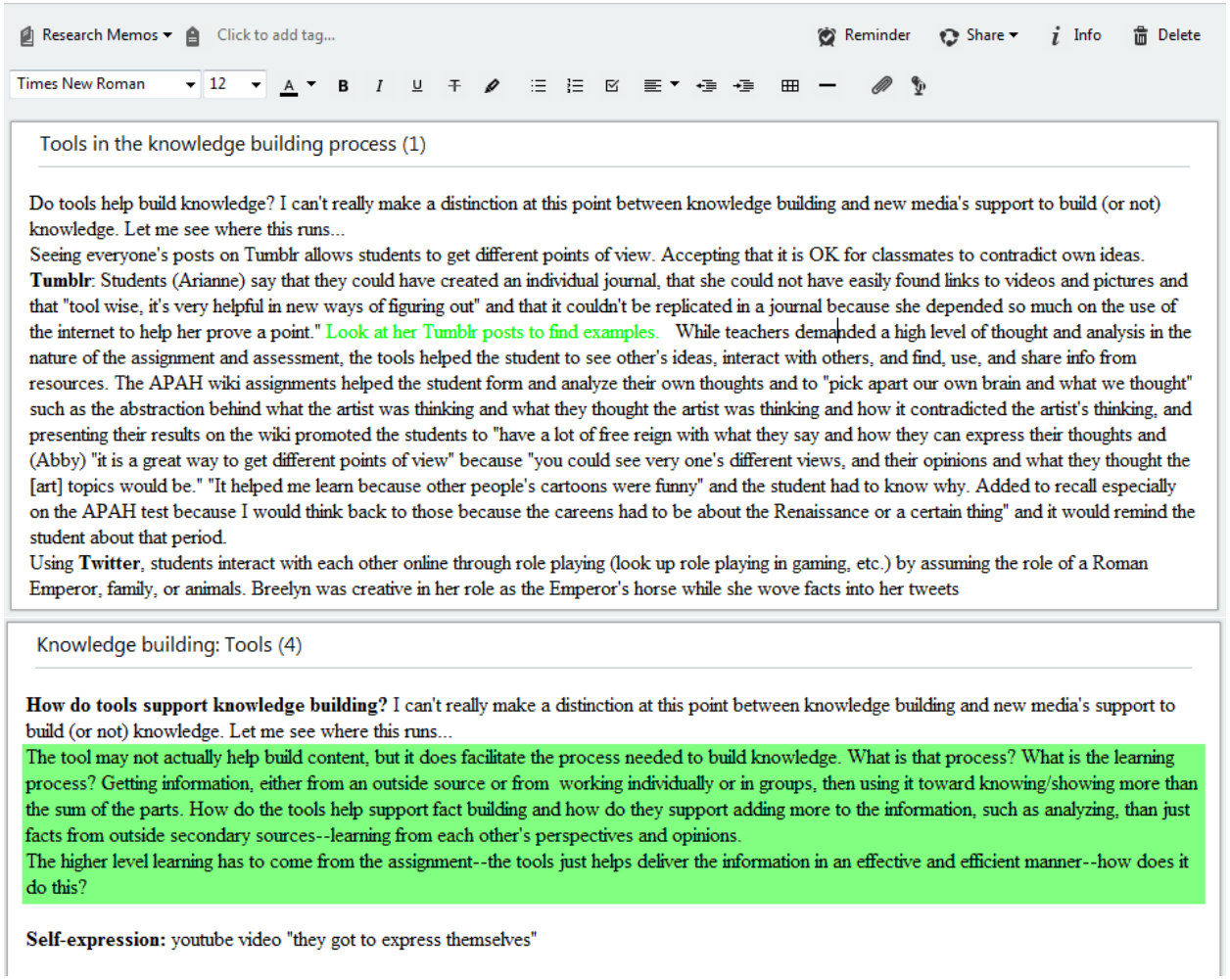
Code Family: *Tumblr* Benefits & Challenges
Created: 2013-07-24 14:10:55 (Super)
Codes (21): [*Tumblr*] [*Tumblr* classroom use: capture immediate reaction to revisit later] [*Tumblr* classroom use: show images, etc. to discuss] [*Tumblr*: allows for bringing in examples] [*Tumblr*: alternative ways of thinking] [*Tumblr*: build community] [*Tumblr*: class archive] [*Tumblr*: contributed to close-knit class] [*Tumblr*: did not find useful] [*Tumblr*: drawbacks] [*Tumblr*: edit posts] [*Tumblr*: extra postings] [*Tumblr*: immediacy] [*Tumblr*: informal writing, smart & thoughtful] [*Tumblr*: personal reflection] [*Tumblr*: promotes informal expression] [*Tumblr*: prompts] [*Tumblr*: react to reading] [*Tumblr*: students learned about each other] [*Tumblr*: students loved it] [*Tumblr*: use to initiate or continue conversation]
Quotation(s): 46

Code Family: *Twitter*
Created: 2013-07-24 14:11:27 (Super)
Codes (4): [*Twitter*] [*Twitter* benefits] [*Twitter*: drawback] [*Twitter*: everyone sees posts]
Quotation(s): 18

Code Family: Wiki Benefits & Challenges
Created: 2013-07-24 16:36:59 (Super)
Codes (5): [wiki] [wiki facilitates learning] [wiki facilitating thinking] [wiki provides options] [wiki: use to organize class assignments and documents]
Quotation(s): 36

Appendix I

Progression of memo from focused code “knowledge building” to theoretical categories:



Knowledge building: Tools (5)

How do tools support knowledge building? I can't really make a distinction at this point between knowledge building and new media's support to build (or not) knowledge. Let me see where this runs...
The tool may not actually help build content, but it does facilitate the process needed to build knowledge. What is that process? What is the learning process? Getting information, either from an outside source or from working individually or in groups, then using it toward knowing/showing more than the sum of the parts. How do the tools help support fact building and how do they support adding more to the information, such as analyzing, than just facts from outside secondary sources--learning from each other's perspectives and opinions.
The higher level learning has to come from the assignment--the tools just helps deliver the information in an effective and efficient manner--how does it do this?

Some of the **knowledge building**: making connections, place in (build) context, raise level of concern--resulting in producing better work, participation, octopus thinking, application, information processing--using information for the need at hand, some fact/content building but this is not the most important, jumpstart own thought process by reading what classmates have posted in order to get started on an assignment or clearing away uncertainty during thought process during the assignment by looking at another perspective, learning material for final from each other by looking at different perspectives and such (see gdocs)

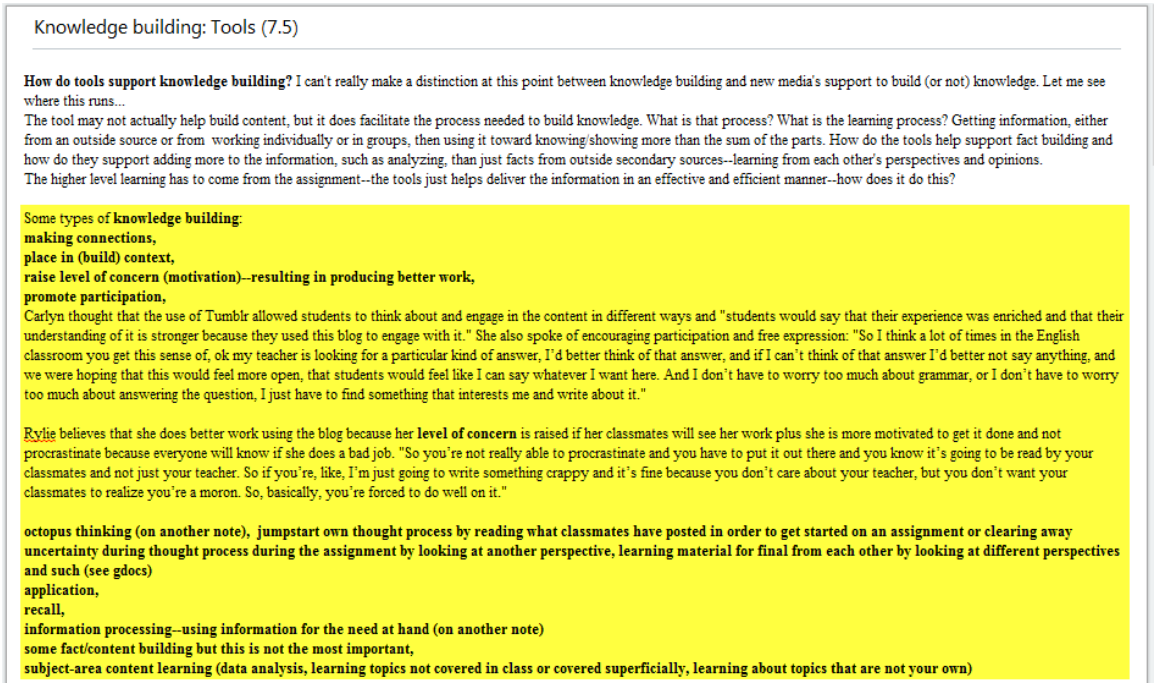
Self-expression: *youtube* video "they got to express themselves" Does this mean creativity? Nick saw value in the freedom of expression allowed by the twitter project.

Knowledge building: Tools (7)

How do tools support knowledge building? I can't really make a distinction at this point between knowledge building and new media's support to build (or not) knowledge. Let me see where this runs...
The tool may not actually help build content, but it does facilitate the process needed to build knowledge. What is that process? What is the learning process? Getting information, either from an outside source or from working individually or in groups, then using it toward knowing/showing more than the sum of the parts. How do the tools help support fact building and how do they support adding more to the information, such as analyzing, than just facts from outside secondary sources--learning from each other's perspectives and opinions.
The higher level learning has to come from the assignment--the tools just helps deliver the information in an effective and efficient manner--how does it do this?

Some of the **knowledge building**: making connections, place in (build) context, raise level of concern--resulting in producing better work, participation, octopus thinking, application, recall, information processing--using information for the need at hand, some fact/content building but this is not the most important, jumpstart own thought process by reading what classmates have posted in order to get started on an assignment or clearing away uncertainty during thought process during the assignment by looking at another perspective, learning material for final from each other by looking at different perspectives and such (see gdocs), subject-area content learning (data analysis, learning topics not covered in class or covered superficially, learning about topics that are not your own)

Self-expression: *youtube* video "they got to express themselves" Does this mean creativity? Nick saw value in the freedom of expression allowed by the twitter project. Tumblr supported free expression: Carlyn



Knowledge building: Tools (7.5)

How do tools support knowledge building? I can't really make a distinction at this point between knowledge building and new media's support to build (or not) knowledge. Let me see where this runs...
The tool may not actually help build content, but it does facilitate the process needed to build knowledge. What is that process? What is the learning process? Getting information, either from an outside source or from working individually or in groups, then using it toward knowing/showing more than the sum of the parts. How do the tools help support fact building and how do they support adding more to the information, such as analyzing, than just facts from outside secondary sources--learning from each other's perspectives and opinions.
The higher level learning has to come from the assignment--the tools just helps deliver the information in an effective and efficient manner--how does it do this?

Some types of **knowledge building**:
making connections,
place in (build) context,
raise level of concern (motivation)--resulting in producing better work,
promote participation,
Carlyn thought that the use of Tumblr allowed students to think about and engage in the content in different ways and "students would say that their experience was enriched and that their understanding of it is stronger because they used this blog to engage with it." She also spoke of encouraging participation and free expression: "So I think a lot of times in the English classroom you get this sense of, ok my teacher is looking for a particular kind of answer, I'd better think of that answer, and if I can't think of that answer I'd better not say anything, and we were hoping that this would feel more open, that students would feel like I can say whatever I want here. And I don't have to worry too much about grammar, or I don't have to worry too much about answering the question, I just have to find something that interests me and write about it."

Rylie believes that she does better work using the blog because her **level of concern** is raised if her classmates will see her work plus she is more motivated to get it done and not procrastinate because everyone will know if she does a bad job. "So you're not really able to procrastinate and you have to put it out there and you know it's going to be read by your classmates and not just your teacher. So if you're, like, I'm just going to write something crappy and it's fine because you don't care about your teacher, but you don't want your classmates to realize you're a moron. So, basically, you're forced to do well on it."

octopus thinking (on another note), jumpstart own thought process by reading what classmates have posted in order to get started on an assignment or clearing away uncertainty during thought process during the assignment by looking at another perspective, learning material for final from each other by looking at different perspectives and such (see gdocs)
application,
recall,
information processing--using information for the need at hand (on another note)
some fact/content building but this is not the most important,
subject-area content learning (data analysis, learning topics not covered in class or covered superficially, learning about topics that are not your own)

Knowledge building tools as support to cognition (10)

11/3 Just what is knowledge building in the content areas? I originally thought of it as facts, I suppose. Look at the curriculum maps for content and skills--the concepts below probably are not addressed in those.

Talk about explicit knowledge and tacit knowledge from Seely Brown's works.

Two kinds of knowledge that the tools promote or support:

1. subject-area content acquisition (applications), making connections, application of knowledge (is this explicit knowledge?)
2. broadening perspectives and learning from others such as good habits, others perspectives/opinions, those people skills (is this tacit knowledge?)

Do the tools support tacit knowledge building more than they do explicit?

Can the transferable skills go under tacit knowledge? This may be a breakthrough if they can! 11/3

The Tumlr posts (Carlyn) believes that by posting, students "made connections to the material that they wouldn't have made otherwise. It pushed them in the direction of taking these books outside of the classroom and connecting them to their lives, which is huge." Students also had to respond to each other's posts so they had to interact and read and think about them. It allowed them to think about and engage in the content in different ways.

Two **objectives** of the course: Reflect independently and creatively based on personal experience/beliefs
Make connections between themes of the material and real life issues

Is it about the tool, the product, the process, or just the joy of learning in general? It depends with some teachers.

How do tools support knowledge building? I can't really make a distinction at this point between knowledge building and new media's support to build (or not) knowledge. Let me see where this runs... The tool may not actually help build content, but it does facilitate the process needed to build knowledge. What is that process? What is the learning process? Getting information, either from an outside source or from working individually or in groups, then using it toward knowing/showing more than the sum of the parts. How do the tools help support fact building and how do they support adding more to the information, such as analyzing, than just facts from outside secondary sources--learning from each other's perspectives and opinions.
The higher level learning has to come from the assignment--the tools just helps deliver the information in an effective and efficient manner--how does it do this?

Because new media's nature is to be constructive and support user-added content, the tool itself does not contribute to knowledge building but supports the structure or provides elements that helps students process information into something more than a collection of facts. Talk about how the tools expand the reach or capabilities of the assignment which in turn supports KB (cognition) and SD (cognitive distribution). Or is cognition facilitated through cognitive distribution of the tools?

Some types of **knowledge building**: (Cognition) Behavioral, constructive
1. making connections MaryAnn wants students to find real world applications so that students would be able to expand beyond the scope of what they were doing in the classroom out to ways in which art history becomes part of popular culture by having a repository of examples she found and using the wiki to give students opportunities to create their won kind of going from the curriculum to real world **connections**. MaryAnn: Looking at each other's cartoons required that the student **applied (application)** what was learned in class and to see how another person applied that material in the real world. Padman got to **connect** a lot with his emperor's father and his emperor's son "was very popular in Roman culture so I connected a lot with him because we had a lot of similarities and they connected with me. We both connected on the same achievements like architectural and military achievements." Param found it helps him make connections through his engagement in interacting with the other characters. "And the twitter project, you know it makes it look…we are actually doing something, it's not like a waste of time, but it seems more fun. It's more interesting to talk to other emperors and twitter about them and post a tweet about, oh you did so and so and so, and you destroyed an empire in say ,whatever year. So it kinda brings you back to how they actually talked to each other and how they respond to each other in the past, from one emperor to an opposing senator or something, and I kinda learn better, it's just me, I learn better from technology" Braden: I interacted with emperors that were nearby me. ... that part was a bit weird, having to communicate with someone who lives 300 years before you in a completely different time, but it was also good to see some of the similarities between emperors, but that part was hard I though to sort of find something and it required a lot of searching through what you already had, and looking at other tweets. It took a lot of work. **making connections.** Karen talks about learning from others tweets, she sees what war that emperor was a part of, when he took reign or who died throughout her emperor's life. Doing a research paper is a private product and everyone would not get any knowledge of other emperors and with twitter, you have access to their pages and see everything they wrote which helps with her interactions between the emperors. She felt that "get[ting] to relate to other emperors gave her an even better knowledge of them." Karen gets to see what Hadrian did in this particular year and it reminded her of what her emperor did in his war (**recall or making connections?**). Param suggests that twitter helps him relate his emperor to others and note that one was a few years before or after his because he could just go on and read about basic historical background **(facts)** and relate that for example an emperor was a few years after his and more stuff happened that he could relate to (**making connections**)

2. place in (build) context Braden felt that he could have learned the same things about his emperor if he had written a research paper, but doesn't feel like he would have been able to get the broad range of information about other Emperor's and fit it into context. NM also thought that the hashtags students developed showed that they had an emotional response to the information, whether it was their own, or their emperor's perceived emotions--what the emperor might have said." Suggestion for next year: use the hashtags to show when events happened to help students place their characters in context if they search by that date and see what is going on in that year. Help them **build context** for their own characters. Padman indicated that Twitter was *absolutely necessary for the assignment* because learning about the other emperors and putting his in **context** "would be more difficult, because I mean you would have to look at theirs physically and look down their timeline, but it would not be as interactive I guess." He was able to learn about the emperors and see how others interacted with them also:

3. raise level of concern (motivation)--resulting in producing better work (Add info from *How Learning works* about **performance goals** p. 71**)** MaryAnn: Having to post for their peers to see, **raised their level of concern** to do better work--they do not want to look foolish in front of their friends. Rylie believes that she does better work using the blog because her **level of concern** is raised if her classmates will see her work plus she is more motivated to get it done and not procrastinate because everyone will know if she does a bad job. "So you're not really able to procrastinate and you have to put it out there and you know it's going to be read by your classmates and not just your teacher. So if you're, like, I'm just going to write something crappy and it's fine because you don't care about your teacher, but you don't want your classmates to realize you're a moron. So, basically, you're forced to do well on it." Iris talks about making her notes better when she is working on gdocs with another person because her "notes can sometimes be confusing" so she makes them better where another person can understand them." **Raises the level of concern.**

From *How Learning Works* p. 71-72 "Students are motivated primarily by *performance goals* (Dweck & Leggett, 1988). Those involve protecting a desired self-image and projecting a positive reputation and public persona. When guided by performance goals, students are concerned with normative standards and try to do what is necessary to demonstrate competence in order to appear intelligent, gain status, and acquire recognition and praise. Elliot and colleagues make a further distinction among performance goals. They suggest that goals focused on performance may take two forms: performance-approach goals and performance-avoidance goals. Students with performance-approach goals focus on attaining competence by meeting normative standards. Students with performance-avoidance goals on the other hand focus on avoiding incompetence by meeting standards. They suggest that the cognitive framework with which students approach learning is different fro those with an approach versus avoidance orientation, and results of research suggest that performance-approach goals are more advantageous to learning then performance-avoidance goals."

4. promote/foster participation (closely tied with motivation to do well for peers above) Facilitates participation for quiet/uncertain students. Gives voice to those students who have different ways of communicating/learning. Also fun goes under here.
Carlyn thought that the use of Tumblr allowed students to think about and engage in the content in different ways and "students would say that their experience was enriched and that their understanding of it is stronger because they used this blog to engage with it." She also spoke of encouraging participation and free expression: "So I think a lot of times in the English classroom you get this sense of, ok my teacher is looking for a particular kind of answer, I'd better think of that answer, and if I can't think of that answer I'd better not say anything, and we were hoping that this would feel more open, that students would feel like I can say whatever I want here. And I don't have to worry too much about grammar, or I don't have to worry too much about answering the question, I just have to find something that interests me and write about it." MaryAnn: Students who have a difficult time with oral expression is able to be very confident and forthcoming on this because they've got time to think about it, they can polish it before they put it in front

of any body's ears or eyes--**promotes participation. Vicarious learning?** Nick observed that students emulated the pioneers of creative ways to apply their information in tweets and it gave him voice. His example of kids copying Heath: Heath was one of the vanguard, the forefront of people who…Heath started doing it this way and I saw other students do it similarly, and that's not something he would get anywhere else. I purposefully gave him emperors that had shorter reigns so that it wasn't such a huge, overwhelming amount of information. And so, he had less information to parse through, but had more people to deal with and I was really impressed with, from the get go, he developed personalities for his emperors like that, and it was funny and quirky and it's not something that, for a student with his kind of learning difference, it's not something he can do in any other way. In that way, the medium of twitter gave him a liberty that he would not have had anywhere else. ... The other thing that I thought was really neat about this was that a student with pretty extreme learning differences, functioned on a completely different level on this project than any other work that he's done in the class.

5. Learning from others: Connectivism (11/3) octopus thinking (on another note), jumpstart own thought process by reading what classmates have posted in order to get started on an assignment or clearing away uncertainty during thought process during the assignment by looking at another perspective, learning material for final from each other by looking at different perspectives and such (see gdocs). Is this cognitive comparison? Or peer assisted learning?

Added to Knowledge building 11/3/13

"The connections students made through the Ning social network emphasized *connectivism*, where interactions
that were generated by these connections, whether informal or formal, allowed students to behave in different ways and learn from one another rather than just from the teacher. As a result, opportunities to present new and emergent knowledge continued to develop which helped to enhance the teaching and learning process." Casey, Designing learning, 2011.

Connectivism, Siemens, 2004.

Talk about how the tools helped students think about things differently through the perspectives and opinions of their classmates. Octopus thinking is a way of branching out and thinking about a number of different issues at the same time and how they all connect. (Kate)

Look up scholarly research on the value of learning from others' opinions/perspectives.

English objectives: Make connections between themes of the material and real life issues. Prove a thesis using textual evidence and analysis. Reflect independently and creatively based on personal experience/beliefs.

Kate: "We were hoping it was a facilitator, I think, without necessarily expressing that. We were hoping that, in a way, [the blog] would make their minds more flexible and more open and that some surprising things might happen. Every time that happens, that kind of helps open their minds a little bit, any time there's something surprising, that they see something new for the first time and their like, "Oh!" Any time they see someone else, too, practicing octopus thinking or octopus writing. Again, this is just a term that we came up with in the confines of our own class"

So, other students' perspectives and opinions contribute to octopus thinking.

"I think that's what makes it invaluable is for them to see other people thinking about something that they've had to think about. And, they're not going to be 14 exactly same answers to the same question. And

they don’t always get to see what other people think about things. They hear what the kids say in class, but they don’t get to hear everybody’s voice and not everybody gets a chance to answer the same question. The questions aren’t always…you can’t have one question that you get to talk about for 20 minutes unless it’s a really good question and you’ve got a really good class. That’s what’s really…where else can you have that? Where you have something that you want them to think about, and they all think about it and then they all get to see what everybody’s thoughts were." (There is a connection between octopus thinking and encouraging participation.)

Seeing everyone's posts on Tumblr allows students to get different points of view. Accepting that it is OK for classmates to contradict own ideas--learning from classmates contradictions of your ideas.

While teachers demanded a high level of thought and analysis in the nature of the assignment and assessment, the tools helped the student to see other's ideas, interact with others, and find, use, and share info from resources.

Cady talks about how **GDocs** helps her find some clarity when, after focusing on a topic or problem for so long that she can clear the fogginess by seeing other's "two cents" on the subject "it's nice to see what they have to think and come from a different angle, a different view." Caroline J talks about her having one definition in Env. Sci and being certain of an example, but then her lab partner would post a different def and his would look a lot better. She has learned that someone else might have a completely different angle of what they think it is. Another example of application is from Cady--reading how a classmate interpreted lighting in a masterpiece, gave her a perspective she had not thought about before and she was able to use that knowledge when interpreting another work of art.

Hallie talks about how the wiki facilitated the assignments that required having to revisit former assignments of her own and her classmates and by seeing how her classmates were analyzing them would help her get ideas for her new ones such as applying an idea about lighting that she hadn't thought of to a new art work piece. So, reading from others posts aides in **application.** She thinks that it helped her to have more ways to interpret art, because while she thinks her teacher does a very good job at teaching about art history, this "kinda applied it in another way." she doesn't think she learned more, but just applied what she already knew in a different way. She also feels that she learns from the notes of a past student that are posted on the wiki, for instance, she has the pictures and little summaries, and if iti s worded differently from how I did nit, it kinda sinks in better because you are just seeing it in a different way.

Kendra thinks that her APAH teacher teaches in a very specific way and "some people interpret it very differently and having them put down what they think of a painting because everyone has a different perspective on painting, whether you're an art history teacher or just a student, everyone is going to think differently of the painting. Being able to see everyone's opinion and I think especially in art history because it is so abstract, having everyone's information where I can just go through and be like "Hey, I wonder what Ashley thought of this picture and realizing that I've never looked at that painting like that before, but I totally see that and the next time I look at that artist, that's what I'll focus on." Kendra thinks that the tumblr is necessary because she can see how everyone else is perceiving the information--while it is not the content they are learning in English, it is how others are digesting it. "It's like having a book of everyone's opinions and thoughts but every easily accessible" "**It is a new way to learn."--this can be a theme because kids are used to being assessed on their own merit and not allowed or encouraged to use other's ideas in forming their own. By seeing each other's ideas in print online, they can digest the information... and it is sanctioned by their teacher because the teacher made the tools accessible.** and (Abby) "it is a great way to get different points of view" because "you could see very one's different views, and their opinions and what they thought the [art] topics would be."

Kate said that students took some interesting angles and that by seeing how someone else can answer a question that you saw in this black and white way, there was this whole other set of possibilities that somebody can go really out there and have this really interesting answer is, I think really enlightening for people." It allows students in their next post to take some risks and be a little more creative or to think differently, if this does not come naturally to them (**Vicarious production?**). By seeing other's interesting posts, that student who is focused on the right answer will be more liberal in the ways that she is thinking about her own answers. Students relate things that they learned by reading or experiencing outside the classroom--relating exactly to a topic being discussed in the class. Students posts became better as they went along. "You know, I think that they were definitely were more comfortable with it and they definitely had more fun doing it, and I think they were probably quicker on their feet about it. That all came from seeing everybody else doing it." They learned by reading others. Teachers required them to read and reply to each other throughout the year.

Pierce sees the value in getting other's perspectives to add to his own and finds it "interesting to get multiple perspectives on something."Pierce to see how his classmate's ideas compared and contrasted from his own and to get a general feel of what he was going for. **jumpstart**

Mackenzie said that her partners information helped her to focus on the task at hand because she wasn't sure what was going on. If she gets stuck, she can look at her partner's work on gdocs to **jumpstart** her thinking and figure out the key things she was missing. "If it was something that answered one of the questions and I'd have to go and researc hit and get more facts on it and the notes really did help."

Sarah thinks that using gdocs to make a study sheet for junior english gave her a different perspective on something that maybe she didn't see. She also thinks that looking at her classmate's pages on the wiki gives her a place to draw ideas from and to appreciate her classmate's humorous work.

Ashley: wiki "You can also learn new and different content or perspectives or ideas from your classmates pages" See how my classmates contradict my thoughts." "Sometimes it's nice to have your thoughts on a page and other peoples' of the same topic or same assignment so you can go back and look at them … but I think it was helpful, just as a way to free [follow up] after you'd been discussing in class for a while" Students (Ashley) say that when she was lost or needed a little push of what direction to go, that she could look at classmates pages to **jumpstart** her own thinking and see what direction to go ... to see what we were supposed to do." You can also learn new and different content or perspectives or ideas from your classmates pages". and Brendan thought this also that he "frequently goes to other people's pages, look at what's getting their thought process in motion, using it to help got my own thought process rolling."

Elena thought it was better to see what her classmates thought about a topic instead of just turning in a paper for a teacher and not knowing what others thought. It was interesting reading about other's opinions.

Iris feels that with gdocs she can look at other group members' notes and look at what they are thinking and their ideas on it and she can use that with what she is going to write or contribute to the group (look at Iris's notes)

Kim thinks that people have a different way of looking at things. "That there isn't just one way to look at something like a piece of art. Different people have different views or takes on what this means. I don't think that there is one right answer. I think that there are probably multiple right answers. And sometimes Ms. Russell might say one thing and someone might raise their hand and say 'what about this?' and she's, like, 'oh, I didn't think about that, but it's definitely valid. It's definitely, like, a good, definite answer to that question, it's just not what I thought of' Which I definitely learn from that, because I'm, like, oh I didn't think about it that way I was thinking about it this way. So, it's not just Ms. Russell just standing up there lecturing, it's kinda, like, give-and-take, I guess." Kim likes seeing what other people have done

because it **jumpstarts** her own ideas--"like oh they did this, which leads me to do this. It kinda causes me to think about that."

Padman stated that "but we could go and look at like other people's brains and connect our brains to different people like share similarities on how emperors could be good or how emperors could need improvement so I mean, it helped in a lot of different ways, because it seemed simple at first but you could go do a lot of different stuff."

Param suggests that by using twitter, he could learn from others standpoints, viewpoints, and seeing what others thought was most important about their emperor.

6. application (transfer 11/3/13--add from *How Learning Works*) MaryAnn: She wants students to **apply** the knowledge to various pieces of art in different ways so by having to look at each other's cartoons, they are having to apply material that was covered in class and they're having to see how another person applies that in the real world. So it is forcing them to think differently on a lot of different occasions and on a lot of different levels. NM: Students **applied (application)** the information they found in sources: "I had them divide their research notes up in a way that it would be clear for me to tell what was being condensed into one or multiple tweets. So, I can see the information that they researched and then I can look at their twitter feed and see how it translated into their twitter feed. So, they definitely have taken that information and represented it."

7. recall
Abby "(the wiki) It helped me learn because other people's cartoons were funny" and the student had to know why. Added to **recall** especially on the APAH test because I would think back to those because the careens had to be about the Renaissance or a certain thing" and it would remind the student about that period. Making connections between music videos and their relation to art pieces and how the music affects it and how the images affect it." Sarah H thought so, too. It made the pieces more memorable and she thought to the funny cartoon or song to help her recall facts. Made it easier to remember because on the AP Exam you have to know so many pieces of art.

8. information processing--using information for the need at hand (on another note) Nick felt like this was a way for students to visually present their research and show understanding and application. Nick thinks that students had a better understanding of what was really important by having to condense it into 140 characters, as well as, understand the full context of the reign, as they studied in in its entirety. "I think that the students…by having to take the information that they learned from sources and condense it into 140 characters, not only did they get a better understanding of what was really important in the information they read, but they have then been able, in my mind, to understand the full context of their emperor's reign better because they really get a full picture from birth to death of what happened."

What would scholars call information processing? Taking information from sources and synthesizing it into an appropriate use/response?
Nick: the skill kids developed in this project was to learn how to process information, not remember facts that they can easily look up on wikipedia
Karen talks about "getting the treasure out of the information, so that when you tweet, you only get 140 characters so you … have to get to the point, get the real fact out of it, and put it on there." Nick agrees, saying that their presentation of the research makes them condense it down to 140 characters, which makes them really understand each event or …
Nick believes that **information processing**, using information for the need at hand, is more important than retaining facts "The benefit I saw in this project…and this is sort of one of my beliefs in the future of education…is that I really feel that, in the future, there is going to be a lot less information retention, and a lot more information analysis… being able to take information that is readily available, but apply it to your

needs. So, I bet, if I quizzed some of these kids, they might not be able to remember all of the dates in their emperor's reign, but they took that information and made it meet their needs and created a product that was really interesting. The information is still just as accessible for them because they can either look it up on their own twitter feed or go back to Wikipedia, all that information is still there, but I think that the skill the kids developed in this project is how to process the information. ... I mean, the Roman empire, the Roman history is exciting, there's lots of tawdry details but I like that they took what is relatively banal information of dates and wars and rulings and death, and they got to create a persona out of that." Like Jerry (below) He also wanted kids to go more **indepth** than they would learn in class.
Breelyn talks about one of the main things that she is getting out of the Twitter assignment is the ability to say all of these things that mean so much in so few words. ... it's a good way to figure out how to consolidate your notes." **Transferability**: She uses that skill now in history and English. How to take the "important bits and make sure that I have that information. In English I used to highlight everything. Now I just highlight only the things that I think I would be able to retain if I had a quiz" (A good example is how she summarized all the minor people Caligula killed into one tweet--**main idea**. "You had to figure out how to incorporate everybody's death in just one tweet."
Callie thought of it as a problem to solve--fitting everything "into this certain amount of time and it has to be a certain amount of tweets... and how am I going to do this, but once I came out with a few things ... oh, I get this, I can do it. And overall I found it effective and it was a way I could learn."
Karen: The twitter project helped her practice **getting the "treasure out of the information**" you can't just write a long passage "you have to **get to the point**"
Padman says "You had to shorten the information to make it succinct and get your point across. I know I have trouble making things succinct so that helped me with that a little bit" brevity/main idea
Padman: make it succinct and putting it into twitter ... helped out with ... taking out what's the key information.
Param says "It helps you, I actually had problems of running on and on and on with assignments, it helps you **get straight to the point** and slim it down. A lot of my teachers want me to do that, and it just helps you get to what's important.

9. some fact/content building but this is not the most important, subject-area content learning (data analysis, learning topics not covered in class or covered superficially, learning about topics that are not your own) Breelyn: And in interacting with other Emperors and such, students learned not just about how to portray their own character, but also info about others. Callie. said that if they could have done a printed timeline, but they would have only been concerned with their own and would not have learned about other's emperors. She feels that she understands Roman History in the same way she would have on a report, but this was much more fun. The hashtag helped make sense and filter the feed (such as what others were doing), which she felt like bombarded her. Twitter hashtags made it easy to find the information and the tool motivated her to learn the information more than a regular report would have. She also tried to make her tweets as historically accurate as she could but felt that is "is also hard to determine how that would be." "well, what I got out of the project was just kind of a more comprehensive understanding of roman history and how the emperors kind, of you know, what went on in a reign, what was important, what was kind of similar, because I find that interesting about history, how it can be so similar in some ways even though they were like hundreds or thousands of years apart. So I think that's what I got out of the project, I understood it better because it was on twitter and that was the way I kind of understood, and I get kind of easily bored by like long texts, so the habit of just kind of shortening things on twitter, it was kind of easier to understand for my person." Padman: **Fact building/understanding** "like Nero was an example of a bad emperor, and a lot of people like tweeted at him like oh you should do this because I did this and you shouldn't do that and like, yeah. It helped a lot to look at it in twitter." Param: It also helped him with fact building "I can read 10 or 5 of those tweets, and I know solid information about them. What reforms they did, what changes they did, what they drastically changed to the empire religion-wise. Just what changes they did" Braden indicated that looking through the twitter feed he has able to learn about the other emperors. If he was writing a research paper, it would be individual and the twitter project allowed him to

see everything that everyone else was doing so he was able to get an idea of not only the history of his emperors, but also the history of the whole roman empire which was "more eye opening." Padman talks about learning content through his collaboration with his partner and without the assignment in gdocs, he could not have done that. Brendan feels that no other way of learning and having access to materials on the wiki would give him the same level of understanding that using the wiki does. Brendan feels that being able to see his classmate's work in gdocs, such as lab data, helps him in his learning.

10. Self (creative) expression: *youtube* video "they got to express themselves" Does this mean *creativity*? Nick saw value in the freedom of expression allowed by the twitter project. Tumblr supported free expression: Carlyn.
The APAH wiki assignments helped the student form and analyze their own thoughts and to "pick apart our own brain and what we thought" such as the abstraction behind what the artist was thinking and what they thought the artist was thinking and how it contradicted the artist's thinking, and presenting their results on the wiki promoted the students to "have a lot of free reign with what they say and how they can express their thoughts. Using **Twitter**, students interact with each other online through role playing (look up role playing in gaming, etc.) by assuming the role of a Roman Emperor, family, or animals. Breelyn was creative in her role as the Emperor's horse while she wove facts into her tweets. Breelyn: And in creating different characters surrounding an Emperor's life, through the interactions with other Emperors, it was "really just a plot development of Caligula as a whole." Heath demonstrated how he elaborated on the facts from sources by "exaggerating things from [the emperor's] point of view. He applied a **creative** spin on events such as losing a battle, and by role playing through a twitter ID, he thought about how the emperor would say it rather than how it was stated in the secondary source. 'I didn't lose the battle, your soldiers just overwhelmed mine" instead of just reporting about losing a battle. (Look up who he was talking to here). He also states that he could have learned as much by writing a "good" research paper. NM: Giving personalities to the emperors added a level of creativity and merriment to the task and students had free reign to develop a personality if it wasn't known. Students developed appropriate personalities for the known emperors (theodisis was hyper religious Christian emperor who said Praise Jesus, or the such after each tweet) and showed them in interesting ways.

11. Distributed cognition:

From How Learning Works, p. 106-7. Research has shown that removing extraneous load--aspects of a task that make it difficult to complete but that are unrelated to what students need to learn--is helpful. ... "It can be helpful under some circumstances for instructors to strategically lighten aspects of the task that introduce **extraneous cognitive load** so that students can focus their cognitive resources on the aspects of a task most germane to the learning objectives." For instance, if the learning objective is to give credit to sources--the extraneous cognitive load is standard formatting of citations. NoodleTools does this. Google Docs allows for lightening the extraneous cognitive load by simplifying the organization of collaborative projects. Talk about cognitive distribution for the tools such as gdocs.

Distributed cognition The ability to interact meaningfully with
tools that expand mental capacities. Jenkins et al. 2006

Concepts that are unique to GDocs, wiki, twitter, blog here that inform distributed cognition

---
Wiki:
Two objectives of the course are to Demonstrate skill at formal analysis of works of art both orally and in essays and Demonstrate through comparative analysis similar approaches used by artists around the globe. (put analysis def here)

References

Agarwal, N. (2011). Collective learning: An integrated use of social media in learning environment. In B. White, I. King, & P. Tsang (Eds.), *Social media tools and platforms in learning environments* (pp. 37-51). Berlin, Germany: Springer.

Ali, A. M. (2012). Integrating technology with the classroom experience: Learning and leadership in the internet change world of today. *International Journal of Learning & Development , 2*(1), 520-580. Retrieved from http://www.macrothink.org/journal/index.php/ijld/article/view/1489

Ambrose, S. A., Bridges, M. W., DiPietro, M., Lovett, M. C., & Norman, M. K. (2010). *How learning works: Seven research-based principles for smart teaching*. San Francisco, CA: Jossey-Bass.

American Association of School Librarians. (2007). Standards for the 21st-century learner. In *Guidelines and standards*. Retrieved from American Library Association website: http://www.ala.org/ala/mgrps/divs/aasl/guidelinesandstandards/learningstandards/standards.cfm

American Association of School Librarians. (2012). *AASL standards for the 21st-century learner*. Retrieved from American Library Association website: http://www.ala.org/aasl/guidelinesandstandards/learningstandards/standards

Assessment: A 21st century skills implementation guide (Monograph). (2009). Retrieved from Partnership for 21st Century Skills website: http://p21.org/storage/documents/p21-stateimp_assessment.pdf

Association of College & Research Libraries. (2014). Information literacy competency standards for higher education. Retrieved February 22, 2014, from http://www.ala.org/acrl/standards/informationliteracycompetency

Atkinson, P., & Housley, W. (2003). *Interactionism: An essay in sociological amnesia*. Retrieved from ProQuest eBrary database.

Bauerlein, M. (2008). *The dumbest generation: How the digital age stupefies young Americans and jeopardizes our future (Or, don't trust anyone under 30)*. New York, NY: Jeremy P. Tarcher/Penguin.

Baumeister, R. F., & Hutton, D. G. (1987). Self-presentation theory: Self-construction and audience pleasing. In B. Mullen & G. R. Goethals (Eds.), *Theories of group behavior* (pp. 71-87). New York, NY: Springer-Verlag.

Bell, P. D., Zeng, X., & Harris, S. (2011). Blogs and wikis: ICT tools to facilitate critical thinking and learning in a web-based health services and information management curriculum. In A. Mendez-Vilas (Ed.), *Education in a technological world: Communicating current and emerging research and technological efforts* [PDF] (pp. 77-82). Retrieved from http://www.formatex.org/ict/

Bennett, W. L. (2007). Civic learning in changing democracies: Challenges for citizenship and civic education. In P. Dahlgren (Ed.), *Young citizens and new media: Learning for democratic participation* (pp. 59-77). New York, NY: Routledge.

Bennett, W. L. (2008). Changing citizenship in the digital age. In W. L. Bennett (Ed.), *Civic life online: Learning how digital media can engage youth* (pp. 1-24). Cambridge, MA: The MIT Press.

Bertin, M. (2014, January 22). When will we ever learn: Dissecting the Common Core State Standards with Dr. Louisa Moats [Blog post]. Retrieved from http://www.huffingtonpost.com/mark-bertin-md/when-will-we-ever-learn_b_4588033.html

Birks, M., & Mills, J. (2011). *Grounded theory: A practical guide*. Los Angeles, CA: Sage.

Blumer, H. (1969). *Symbolic interactionism: Perspective and method*. Berkeley, CA: University of California Press.

Bowler, L. (2010, January). A taxonomy of adolescent metacognitive knowledge during the information search process. *Library & Information Science Research, 32*(1), 27-42. doi:10.1016/j.lisr.2009.09.005

Boyd, D. M., & Ellison, N. B. (2008). Social network sites: Definition, history, and scholarship. *Journal of Computer-Mediated Communication, 13*, 210-230. doi:10.1111/j.1083-6101.2007.00393.x

Brown, J. S., & Thomas, D. (2010). Learning in/for a world of constant flux: Homo sapiens, homo faber & homo ludens revisited. In L. E. Weber & J. J. Duderstadt (Eds.), *University research for innovation* [PDF] (pp. 321-336). Retrieved from http://www.glion.org/pdf_livres/g10_University_reserach_for_innovation.pdf

Brown, J. S. (2000). Growing up digital: How the web changes work, education, and the ways people learn. *Change: The Magazine of Higher Learning, 32*(2), 11-20. http://dx.doi.org/10.1080/00091380009601719

Brown, J. S. (Presenter). (2012, November 22). *Learning in and for the 21st Century*. Speech presented at National Institute of Education, Nanyang Technological University, Singapore.

Bryer, T. A., & Zavattaro, S. M. (2011, September). Social media and public administration: Theoretical dimensions and introduction to symposium. *Administrative Theory & Praxis, 33*(3), 325-340. doi:10.2753/ATP1084-1806330301

Carr, N. (2011). *The shallows: What the internet is doing to our brains*. New York, NY: W. W. Norton & Company, Inc.

Casey, G., & Evans, T. (2011, November). Designing for learning: Online social networks as a classroom environment. *The International Review of Research in Open and Distance Learning, 12*(7), 1-26. Retrieved from http://www.irrodl.org/index.php/irrodl/article/view/1011/2039

Charmaz, K. (2006). *Constructing grounded theory: A practical guide through qualitative analysis*. Thousand Oaks, CA: Sage Publications, Inc.

Chen, B., & Bryer, T. (2012, January). Investigating instructional strategies for using social media in formal and informal learning. *The International Review of Research in Open and Distance Learning, 13*(1), 87-104. Retrieved from http://www.irrodl.org/index.php/irrodl/article/view/1027/2115

Ciardiello, A. V. (1998, November). Did you ask a good question today? Alternative cognitive and metacognitive strategies. *Journal of Adolescent & Adult Literacy, 42*(3), 210-219. Retrieved from http://www.jstor.org/stable/10.2307/40014681

Commission on Accreditation. (2010). *A 21st century imperative: A guide to becoming a school of the future* (J. Burnett, M. McGovern, P. Miller, & N. Raley, Eds.) (Monograph). Retrieved from National Association of Independent Schools website: http://www.nais.org/Articles/documents/NAISCOASchools.pdf

Consolidated appropriations act, 1 U.S.C. § 1701 (2001), http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=106_cong_public_laws&docid=f:publ554.pdf

Corbin, J., & Strauss, A. (2008). *Basics of qualitative research: Techniques and procedures for developing grounded theory* (3rd ed.). Thousand Oaks, CA: Sage Publications, Inc.

Delli Carpini, M. X. (2010, June). Gen.com: Youth, civic engagement, and the new information environment. *Political Communication, 17*(4), 341-349. doi:10.1080/10584600050178942

Denzin, N. K., & Lincoln, Y. S. (2003). *The landscape of qualitative literature: Theories and issues* (2nd ed.). Thousand Oaks, CA: Sage Publications, Inc.

Denzin, N. K., & Lincoln, Y. S. (2008). *Strategies of qualitative inquiry* (3rd ed.). Thousand Oaks, CA: Sage Publications, Inc.

Denzin, N. K. (2004). Symbolic interactinism. In U. Flick, E. Von Kardorff, & I. Steinke (Eds.) & B. Jenner (Trans.), *A companion to qualitative research* (pp. 81-87) [PDF]. Retrieved from http://www.sdhprc.ir/download/A_Companion_to_qualitative_research.pdf

Department of Labor, What work requires of schools: A SCANS report for America 2000, H.R. Rep. No. 35-35 (1991), http://wdr.doleta.gov/SCANS/whatwork/whatwork.pdf

Dervin, B., & Reinhard, C. D. (2007, January 31). *Sense-making the information confluence: The whys and hows of college and university user satisficing of information needs*. Retrieved from Ohio State University School of Communication website: http://imlsproject.comm.ohio-state.edu/imls_reports/PERFORMANCE_REPORT/PERFORM_ONLINE.pdf

Dredger, K., Woods, D., Beach, C., & Sagstetter, V. (2010). Engage me: Using new literacies to create third space classrooms that engage student writers. *Journal of Media Literacy Education, 2*(2), 85-101. Retrieved from http://altechconsultants.netfirms.com/jmle1/index.php/JMLE/article/view/92

Dror, I. E., & Harnad, S. (2008). Offloading cognition onto cognitive technology. In I. E. Dror & S. Harnad (Eds.), *Cognition distributed: How cognitive technology extends our minds* (pp. 1-23). Amsterdam: John Benjamins.

Ellis, D. (1993, October). Modeling the information-seeking patterns of academic researchers: A grounded theory approach. *Library Quarterly, 63*(4), 469-486. doi:10.1086/602622

Eraut, M. (2000). Non-formal learning and tacit knowledge in professional work. *British Journal of Educational Psychology, 70*(1), 113-136. Retrieved from http://old.mofet.macam.ac.il/iun-archive/mechkar/pdf/non-formallearning.pdf

Ertmer, P. A., Newby, T. J., Liu, W., Tomory, A., Yu, J. H., & Lee, Y. M. (2011, February). Students' con?dence and perceived value for participating in cross-cultural wiki-based collaborations. *Educational Technology Research and Development, 59*, 213-228. doi:10.1007/s11423-011-9187-4

Fidel, R., Davies, R. K., Douglass, M. H., Holder, J. K., Hopkins, C. J., Kushner, E. J., . . . Toney, C. D. (1999). A visit to the information mall: Web searching behavior of high school students. *Journal of the American Society for Information Science, 50*(1), 24-37. doi:10.1002/(SICI)1097-4571(1999)50:124::AID-ASI53.0.CO;2-W

Flanagin, A. J., & Metzger, M. J. (2010). *Kids and credibility: An empirical examination of youth, digital media use, and information credibility*. Retrieved from The MIT Press and The MacArthur Foundation website: http://mitpress.mit.edu/books/full_pdfs/Kids_and_Credibility.pdf

Forte, A. (2009). *Learning in public: Information literacy and participatory media* (Doctoral dissertation, Georgia Institute of Technology, Atlanta, GA). Retrieved from http://smartech.gatech.edu/jspui/bitstream/1853/29767/1/forte_andrea_200908_phd.pdf

Gasson, S., & Agosto, D. E. (2008). *Millennial students & technology use: Implications for undergraduate education*. Retrieved from Drexel University website: http://www.ischool.drexel.edu/content/documents/Gasson1178.pdf

Gee, J. P. (2007). *What video games have to teach us about learning and literacy*. New York, NY: Palgrave Macmillan.

Gee, J. P., & Hayes, E. R. (2011). *Language and learning in the digital age*. London, England: Routledge.

The George Lucas Educational Foundation. (2014). Common core in action series. Retrieved March 29, 2014, from Edutopia: What works in education website: http://www.edutopia.org/blog/common-core-in-action-series

Glaser, B. G., & Strauss, A. L. (1967). *The discovery of grounded theory: Strategies for qualitative research*. New Brunswick, NJ: AldineTransaction.

Gross, M. (2004). Children's information seeking at school: Findings from a qualitative study. In M. K. Chelton & C. Cool (Eds.), *Youth information-seeking behavior: Theories, models, and issues* (pp. 211-240). Lanham, MD: The Scarecrow Press, Inc.

Guba, E. G., & Lincoln, Y. S. (1982, Winter). Epistemological and methodological bases of naturalistic inquiry. *Educational Communication and Technology*, *30*(4), 233-252. doi:10.1007/0-306-47559-6_19

Gureckis, T. M., & Goldstone, R. L. (2008). Thinking in groups. In I. E. Dror & S. Harnad (Eds.), *Cognition distributed: How cognitive technology extends our minds* (pp. 99-116). Amsterdam: John Benjamins.

Harasim, L. (2012). *Learning theory and online technologies*. New York, NY: Routledge.

Harel Caperton, I., Oliver, A., & Sullivan, S. (2008, December). *The Case for the Globaloria network in West Virginia: Empowering West Virginia youth to create and collaborate online with a 21st-century game-making curriculum*. Retrieved from World Wide Workshop Foundation website: http://www.worldwideworkshop.org/pdfs/Globaloria-WV_YR1_ExecutiveReport.pdf

Haste, H. (2010). Citizenship education: A critical look at a contested field. In L. R. Sherrod, J. Torney-Purta, & C. A. Flanagan (Eds.), *Handbook of Research on Civic Engagement in Youth* (pp. 161-188). Retrieved from http://catalog.lib.utexas.edu/

Head, A. J., & Eisenberg, M. B. (2009, February 4). *Finding context: What today?s college students say about conducting research in the digital age*. Retrieved from The Information School, University of Washington website: http://projectinfolit.org/pdfs/PIL_ProgressReport_2_2009.pdf

Head, A. J., & Eisenberg, M. B. (2010, November 1). *Truth be told: How college students evaluate and use information in the digital age*. Retrieved from Information School, University of Washington and The Macarthur Foundation website: http://projectinfolit.org/pdfs/PIL_Fall2010_Survey_FullReport1.pdf

Head, A. J., & Eisenberg, M. B. (2011, April 4). How college students use the Web to conduct everyday life research. *First Monday, 16*(4). Retrieved from http://firstmonday.org/htbin/cgiwrap/bin/ojs/index.php/fm/article/view/3484/2857

Hillyer, N., Parker, L. L., & Gilbert, L. (2011, March 30). Information literacy: Reinvention for digital natives. In *ACRL 2011*. Symposium conducted at the Annual Conference of the Association of College and Research Libraries, Philadelphia, PA. Retrieved from http://www.ala.org/ala/mgrps/divs/acrl/events/national/2011/papers/information_literacy.pdf

Horne, K., & Pinkston, C. (2013, February 23). Humanities English 12: Topic 1 global literature curriculum map. Retrieved July 28, 2013, from Rubicon Atlas website: http://standrews.rubiconatlas.org/Atlas/Browse/View/Map?CurriculumMapID=75 &

Hughes, J., & Burke, A. (2011). Using ICTs in middle school literacy programs. In A. Mendez-Vilas (Ed.), *Education in a technological world: Communicating current and emerging research and technological efforts* [PDF] (pp. 581-587). Retrieved from http://www.formatex.org/ict/

International Society for Technology in Education. (2007). 2007 standards. In *National education technology standards* [For students]. Retrieved from http://www.iste.org/Content/NavigationMenu/NETS/ForStudents/2007Standards/ NETS_for_Students_2007.htm

International Society for Technology in Education. (2012). *ISTE NETS-S: Advancing digital age learning*. Retrieved from http://www.iste.org/standards/nets-for-students.aspx

The International Society for Technology in Education. (2012). *About*. Retrieved June, 2012, from http://www.iste.org/about-iste

Ito, M., Baumer, S., Bittanti, M., Boyd, D., Cody, R., Herr-Stephenson, B., . . . Lange, P. C. (2010). *Hanging out, messing around, and geeking out: Kids living and learning with new media*. Cambridge, MA: The MIT Press.

Ito, M., Gutierrez, K., Livingston, S., Penuel, B., Rhodes, J., Salen, K., . . . Watkins, S. C. (2013, January). *Connected learning: An agenda for research and design* [PDF]. Retrieved from http://www.dmlhub.net/publications

Jahnke, I. (2011). Collective learning: An integrated use of social media in learning environment. In B. White, I. King, & P. Tsang (Eds.), *How to foster creativity in technology enhanced learning?* (pp. 37-51). Berlin, Germany: Springer.

Jansen, B. A. (2011, November). Civic education and the learning behaviors of youth in the online environment: A call for reform. *Journal of Social Studies Education Research, 2*(2), 22-42. Retrieved from http://www.jsser.org/index.php/JSSER/article/view/61

Jenkins, H. (2006). *Convergence culture: Where old and new media collide*. New York, NY: New York University Press.

Jenkins, H., Purushotma, R., Weigel, M., Clinton, K., & Robison, A. J. (2006). *Confronting the challenges of participatory culture: Media education for the 21st century*. Retrieved from https://mitpress.mit.edu/books/full_pdfs/Confronting_the_Challenges.pdf

Jennings, C. (2012). *Next generation digital learning strategies* [PDF]. Retrieved from http://www.ark-group.com/downloads/Next-Generation-Digital-Learning-Strategies-Chap.pdf

Kuhlthau, C. C. (2008). From information to meaning: Confronting the challenges of the twenty-first century. *Libri*, *58*(2), 66-73. http://dx.doi.org/10.1515/libr.2008.008

Larusson, J. A., & Alterman, R. (2009, September). Wikis to support the "collaborative" part of collaborative learning. *Computer-Supported Collaborative Learning, 4*, 371-402. doi:10.1007/s11412-009-9076-6

Lassiter, L. E. (2005). *The Chicago guide to collaborative ethnography*. Chicago, IL: The University of Chicago Press.

Latour, B. (1988). *Science in action: How to follow scientists and engineers through society* . Boston, MA: Harvard University Press.

Lemke, C., & Coughlin, E. (2009, May). *Leadership for Web 2.0 in education: Promise & reality*. Retrieved from Consortium for School Networking website: http://www.cosn.org/LeadershipforWeb20inEducationReport/tabid/5359/Default.aspx

Lemke, C. (2010). Innovation through technology. In J. A. Bellanca & R. Brandt (Eds.), *21st century skills: Rethinking how students learn* [PDF] (pp. 243-272). Retrieved from http://go.solution-tree.com/21stcenturyskills/

Lenhart, A., Simon, M., & Graziano, M. (2001, September 1). *The Internet and education: Findings of the Pew Internet & American Life Project*. Retrieved from Pew Research Center website: http://www.pewinternet.org/Reports/2001/The-Internet-and-Education.aspx

Lenhart, A., Arafeh, S., Smith, A., & Macgill, A. (2008, April 24). *Writing, technology, and teens*. Retrieved from Pew Internet and American Life Project website: http://www.pewinternet.org/Reports/2008/Writing-Technology-and-Teens.aspx

Lenhart, A., Purcell, K., Smith, A., & Zickuhr, K. (2010, February 3). *Social media and young adults*. Retrieved from Pew Internet and American Life Project website: http://www.pewinternet.org/Reports/2010/Social-Media-and-Young-Adults.aspx

Lenhart, A., Madden, M., Macgill, A. R., & Smith, A. (2007, December 19). *Teens and social media* (Rep. No. 202-419-4500). Retrieved from The Pew Charitable Trusts website: http://www.pewinternet.org/Reports/2007/Teens-and-Social-Media.aspx

Lincoln, Y. S., Lynham, S. A., & Guba, E. G. (2011). Paradigmatic controversies, contradictions, and emerging confluences, revisited. In N. K. Denzin & Y. S. Lincoln (Eds.), *The Sage handbook of qualitative research* (pp. 97-128). Los Angeles, CA: Sage.

Livingstone, S., Couldry, N., & Markham, T. (2007). Youthful steps towards civic participation: Does the Internet help? In B. D. Loader (Ed.), *Young citizens in the digital age: Political engagement, young people and new media* (pp. 21-34). London: Routledge.

Livingstone, S. (2009). *Children and the Internet: Great expectations, challenging realities*. Cambridge, UK: Polity Press.

MacArthur Foundation. (2009, November). *Exploring digital media & learning* [Information sheet]. Retrieved June 12, 2012, from http://www.macfound.org/media/article_pdfs/DML_BUFF_MARCH_2011.PDF

Mandernach, B. J. (2006). Thinking critically about critical thinking: Integrating online tools to promote critical thinking. *Insight: A Journal of Scholarly Teaching, 1*, 41-49. Retrieved from http://www.insightjournal.net/Volume1/Thinking%20Critically%20about%20Critical%20Thinking-%20Integrating%20Online%20Tools%20to%20Promote%20Critical%20Thinking.pdf

McLeod, J., Shah, D., Hess, D., & Lee, N.-J. (2010). Communication and education: Creating competence for socialization into public life. In L. R. Sherrod, J. Torney-Purta, & C. A. Flanagan (Eds.), *Handbook of Research on Civic Engagement in Youth* (pp. 363-389). Retrieved from http://catalog.lib.utexas.edu/

McNaught, C., Lam, P., Kwok, M., & Ho, E. C. (2011). Building institutional capacity for the use of social media. In B. White, I. King, & P. Tsang (Eds.), *Social media tools and platforms in learning environments* (pp. 137-152). Berlin, Germany: Springer.

Mehra, B., & Braquet, D. (2007). Process of information seeking during "queer" youth coming-out experiences. In M. K. Chelton & C. Cool (Eds.), *Youth information-*

seeking behavior II: Context, theories, models, and issues (pp. 93-131). Lanham, MD: The Scarecrow Press, Inc.

Merriam, S. B. (2009). *Qualitative research: A guide to design and implementation*. San Francisco, CA: Jossey-Bass.

Milner, H. (2009, September). *The Internet: Friend or foe of youth political participation*. Paper presented at 5th biennial conference of the European Consortium for Political Research, Potsdam, Germany. Retrieved from http://internet-politics.cies.iscte.pt/IMG/pdf/ECPRPotsdamMilner.pdf

Montgomery, K. C. (2008). Youth and digital democracy: Intersections of practice, policy, and the marketplace. In W. L. Bennett (Ed.), *Civic life online: Learning how digital media can engage youth* (pp. 25-49). Cambridge, MA: The MIT Press.

National Council for Excellence in Critical Thinking. (1987). The critical thinking community. In *Defining critical thinking*. Retrieved July 28, 2012, from Foundation for Critical Thinking website: http://www.criticalthinking.org/pages/defining-critical-thinking/766

National Forum on Information Literacy. (2012). *What is the NFIL?* Retrieved July 20, 2012, from http://infolit.org/about-the-nfil/what-is-the-nfil/

National Governors Association, & Council of Chief State School Officers. (2014). Standards in your state. Retrieved March 29, 2014, from Common Core State Standards Initiative website: http://www.corestandards.org/

National Governors Association Center for Best Practices, & Council of Chief State School Officers. (2012). *Common core state standards initiative*. Retrieved June 18, 2012, from www.corestandards.org

National Research Council. (2012). *Education for life and work: Developing transferable knowledge and skills in the 21st century* [PDF] (J. W. Pelligrino & M. A. Hilton, Eds.). Retrieved from http://www.nap.edu/catalog.php?record_id=13398

O'Connor, M. K., Netting, F. E., & Thomas, M. L. (2008, January). Grounded theory: Managing the challenges for those facing institutional review board oversight. *Qualitative Inquiry*, *14*(1), 28-45. doi:10.1177/1077800407308907

Our mission. (n.d.). Retrieved June 12, 2011, from Partnership for 21st Century Skills website: http://www.p21.org/about-us/our-mission

Papert, S. (1993, Fall). *Obsolete skill set: The 3 Rs—literacy and letteracy in the media ages* [Reprint of article from Wired magazine]. Retrieved June 10, 2012, from http://www.papert.org/articles/ObsoleteSkillSet.html

Parker, J. K. (2010). *Teaching tech-saavy kids: Bringing digital media into the classroom, grades 5-12*. Thousand Oaks, CA: Corwin.

The Partnership for 21st Century Skills. (2007). *Welcome to route 21*. Retrieved June, 2012, from http://route21.p21.org/

Partnership for 21st Century Skills. (2008). *21st century skills, education & competitiveness: A resource and policy guide*. Retrieved May 18, 2012, from http://www.p21.org/storage/documents/21st_century_skills_education_and_competitiveness_guide.pdf

Partnership for 21st Century Skills. (2011). P21 Common core toolkit: A Guide to aligning the common core state standards with the framework for 21st century skills. Retrieved March 29, 2014, from http://www.p21.org/component/content/article/2-publications/1005-p21-common-core-toolkit

Pascale, C.-M. (2011). *Cartographies of knowledge: Exploring qualitative epistemologies*. Thousand Oaks, CA: SAGE.

Pavlik, J. V., & Powell, A. C. (2003). New media. In D. H. Johnston (Ed.), *Encyclopedia of International Media and Communications* (Vol. 3, pp. 225-233). Retrieved from http://www.sciencedirect.com/science/referenceworks/9780123876706

Polanyi, M. (1966). *The tacit dimension*. Chicago, IL: University of Chicago Press.

Purcell, K., Buchanan, J., & Friedrich, L. (2013, July). *The impact of digital tools on student writing and how writing is taught in schools*. Retrieved from Pew Research Center's Internet & American Life Project website: http://www.pewinternet.org/Reports/2013/Teachers-technology-and-writing.aspx

Purcell, K., Rainie, L., Heaps, A., Buchanan, J., Friedrich, L., Jacklin, A., . . . Zickuhr, K. (2012, November). *How teens do research in the digital world*. Retrieved from Pew Research Center website: http://www.pewinternet.org/2012/11/01/how-teens-do-research-in-the-digital-world/

Reber, A. S. (1989). Implicit learning and tacit knowledge. *Journal of Experimental Psychology, 118*(3), 219-235. http://dx.doi.org/10.1037/0096-3445.118.3.219

Reid, J. R., & Anderson, P. R. (2011). Critical thinking: The foundation of education in a technological world. In A. Mendez-Vilas (Ed.), *Education in a technological world: Communicating current and emerging research and technological efforts* [PDF] (pp. 120-126). Retrieved from http://www.formatex.org/ict/

Rheingold, H. (2008). Using participatory media and public voice to encourage civic engagement. In W. L. Bennett (Ed.), *Civic life online: Learning how digital media can engage youth* (pp. 97-118). Cambridge, MA: The MIT Press.

Rheingold, H. (2010, June 30). It's the learning, not the technology - Jessica K. Parker. In *Digital media and learning central*. Retrieved October 2, 2010, from MacArthur Foundation website: http://dmlcentral.net/blog/howard-rheingold/its-learning-not-technology-jessica-k-parker

Robinson, K. (2006, June). Ken Robinson says schools kill creativity [Video file]. Retrieved from http://www.ted.com/talks/ken_robinson_says_schools_kill_creativity.html

Rose, D. H., & Gravel, J. W. (2012). Curricular opportunities in the digital age [Monograph]. *Students at the Center*. Retrieved from http://www.studentsatthecenter.org/papers/curricular-opportunities-digital-age

Rowlands, I., Nicholas, D., Williams, P., Huntington, P., Fieldhouse, M., Gunter, B., . . . Jamali, H. R. (2008). The Google generation: The information behaviour of the researcher of the future. *Aslib Proceedings: New Information Perspectives, 60*(4), 290-310. doi:10.1108/00012530810887953

Rubin, H. J., & Rubin, I. S. (2005). *Qualitative interviewing: The art of hearing data* (2nd ed.). Thousand Oaks, CA: Sage Publications.

Sadauskas, J., Byrne, D., & Atkinson, R. K. (2013). Toward social media based writing. In A. Marcus (Ed.), *Design, user experience, and usability: Health, learning, playing, cultural, and cross-cultural user experience* (pp. 276-285). Retrieved from Springer LINK database.

School principals and social networking in education: Practices, policies, and realities in 2010. (2010). Retrieved from edWeb.net, Interactive Educational Systems Design, Inc., MCH Strategic Data, and MMS Education website: http://www.edweb.net/fimages/op/PrincipalsandSocialNetworkingReport.pdf

Spink, A., & Cole, C. (2006). Human information behavior: Integrating diverse approaches and information use. *Journal of the American Society for Information Science and Technology*, *57*(1), 25-35. http://dx.doi.org/10.1002/asi.20249

Stryker, S., & Vryan, K. D. (2006). The symbolic interactionist frame. In J. Delamater (Ed.), *Handbook of social psychology* (pp. 3-28). New York, NY: Springer.

Tapscott, D. (2009). *Grown up digital: How the net generation is changing your world*. New York: McGraw Hill.

Taylor, R. (1991). Information and use emvironments. In B. Dervin & M. J. Voigt (Eds.), *Progress in communication sciences* (Vol. 10, pp. 217-255). Norwood, NJ: Ablex.

Thomas, D., & Brown, J. S. (2011). *A new culture of learning: Cultivating the imagination for a world of constant change*. Lexington, KY: CreateSpace.

Todd, R. J. (1999). Back to our beginnings: information utilization, Bertram Brookes and the fundamental equation of information science. *Information Processing & Management*, *35*(6), 851-870. Retrieved from ScienceDirect database.

Todd, R. J. (1999). Utilization of herion information by adolescent girls in Australia: A cognitive analysis. *Journal of the American Society for Information Science*, *50*(1), 10-23.

Todd, R. J. (2003). Adolescents of the information age: Patterns of information seeking and use, and implications for information professionals. *School Libraries Worldwide*, *9*(2), 27-46.

Transforming American education, learning powered by technology: National educational technology plan 2010. (2010, November). Retrieved June 20, 2012, from U.S. Department of Education Office of Educational Technology website: http://www.ed.gov/sites/default/files/netp2010.pdf

Tripp, L. M., & Herr-Stephenson, R. (2009, July). Making access meaningful: Latino young people using digital media at home and at school. *Journal of Computer-Mediated Communication*, *14*(4), 1190-1207. doi:10.1111/j.1083-6101.2009.01486.x

Tuominen, K., & Savolainen, R. (1997). A social constructionist approach to the study of information use as discursive action. In P. Vakkari, R. Savolainen, & B. Dervin (Eds.), *Information seeking in context: Proceedings of the international conference on research in information needs, seeking and use in different contexts* (pp. 81-96). London: Taylor Graham.

U. S. Department of Education. (2009, November). *Race to the top program* [Executive summary]. Retrieved June, 2012, from http://www2.ed.gov/programs/racetothetop/executive-summary.pdf

Van Scoyoc, A. M., & Cason, C. (2006). The electronic academic library: Undergraduate research behavior in a library without books. *Libraries and the Academy, 6*(1), 47-58. doi:10.1353/pla.2006.0012

Von Krogh, G., Ichijou, K., & Nonaka, I. (2000). *Enabling knowledge creation: How to unlock the mystery of tacit knowledge and release the power of innovation*. Oxford: Oxford University Press.

Watkins, S. C. (2009). *The young & the digital: What the migration to social-network sites, games, and anytime, anywhere media means to our future*. Boston: Beacon Press.

Williams, P., & Rowlands, I. (2007, October 18). *Information behaviour of the researcher of the future: The literature on young people and their information behaviour*. Retrieved from Joint Information Systems Committee website: http://www.jisc.ac.uk/media/documents/programmes/reppres/ggworkpackagei.pdf

Wilson, T. D. (1999, June). Models in information behaviour research. *The Journal of Documentation, 55*(3), 249-270. doi:10.1108/EUM0000000007145

Youniss, J., Bales, S., Christmas-Best, V., Diversi, M., McLaughlin, M., & Silbereisen, R. (2002). Youth civic engagement in the twenty-first century. *Journal of Research on Adolescence, 12*(1), 121-148. doi:10.1111/1532-7795.00027

Zhou, N., & Agosto, D. E. (2008). The collaborative information behavior of middle school students in online learning environments: An exploratory study. In *iConference 2008 Posters*. Retrieved from University of Illinois website: https://www.ideals.illinois.edu/handle/2142/15149